

THE IMPACT OF INFLATION ON PROFIT  
AS DETERMINED BY CONTRACTUAL PROVISIONS  
OF NAVAL FPIF SHIPBUILDING CONTRACTS

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# NAVAL POSTGRADUATE SCHOOL

## Monterey, California



# THESIS

THE IMPACT OF INFLATION ON PROFIT  
AS DETERMINED BY CONTRACTUAL PROVISIONS  
OF NAVAL FPIF SHIPBUILDING CONTRACTS

by

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March 1976

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Three separate approaches for providing escalation coverage for profit are discussed. It is recommended that one of these approaches be implemented in future shipbuilding contracts.



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as Determined by Contractual Provisions  
of Naval FPIF Shipbuilding Contracts

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## ABSTRACT

The contractual provisions contained in Naval FPIF Shipbuilding contracts determine to a large extent the impact of inflation on contract profitability. The concern of shipbuilders regarding the inflationary erosion of profitability is due in part to the long-term nature of shipbuilding contracts.

An analysis is made of the payments and escalation provisions contained in fourteen major shipbuilding contracts signed over a span of eight years. Profit profiles for seven of these shipbuilding contracts are generated based upon six payment thresholds. The profit profiles, when expressed in terms of deflated dollars, present value at 15% and present value of deflated dollars at 15% show a declining trend in profitability.

Three separate approaches for providing escalation coverage for profit are discussed. It is recommended that one of these approaches be implemented in future shipbuilding contracts.





## TABLE OF CONTENTS

I.	INTRODUCTION -----	9
A.	PURPOSE -----	9
B.	GENERAL APPROACH -----	11
C.	ORGANIZATION -----	14
II.	CONTRACTOR COMPENSATION AS DETERMINED BY NAVY POLICY -----	16
A.	ESCALATION PAYMENTS -----	17
B.	PROGRESS PAYMENTS -----	25
C.	DELIVERY & GUARANTEE PAYMENTS -----	31
D.	MARKET IMPLICATIONS -----	32
III.	ESCALATION PROVISIONS -----	36
A.	BLS INDICES -----	36
B.	1962 STANDARD CLAUSE -----	38
C.	1975 CLAUSE -----	42
D.	COMPARISON OF ACTUAL ESCALATION PROVISIONS -----	44
IV.	PAYMENTS PROVISIONS -----	53
A.	NAVSHIPS PAYMENTS CLAUSE -----	53
B.	REVISED BILLING BASE -----	62
C.	COMPARISON OF ACTUAL PAYMENTS PROVISIONS -----	64
V.	PROFIT OBJECTIVES -----	71
A.	PROFIT POLICY -----	71



B.	COST INCENTIVES -----	76
C.	PROFIT OBJECTIVES FOR SELECTED CONTRACTS -----	79
VI.	PROFIT PROFILES -----	101
A.	ESTIMATING PROGRESS -----	101
B.	CONTRACT MODEL -----	105
C.	GENERATION OF SELECTED CONTRACT PROFIT PROFILES -----	109
VII.	MEASURES OF PROFIT EROSION -----	112
A.	PURCHASING POWER EROSION OF PROFIT -----	113
B.	DISCOUNTING AT 15% -----	118
C.	DISCOUNTING DEFLATED PROFIT AT 15% -----	121
VIII.	RECOMMENDATIONS -----	129
A.	INCLUDE AN ELEMENT OF PROFIT IN EXISTING COST ESCALATION PROVISIONS -----	130
B.	ESCALATE ACTUAL PROFIT EARNED -----	132
C.	SEPARATE ESCALATION OF TARGET PROFIT -----	133
APPENDIX A	-----	136
APPENDIX B	-----	138
APPENDIX C	-----	142
APPENDIX D	-----	143
BIBLIOGRAPHY	-----	192
INITIAL DISTRIBUTION LIST	-----	195



## LIST OF TABLES

I.	Escalation Incurred as a Percent of Total Projected Escalation -----	20
II.	Contract Profit Rates Bid by Major Private Shipyards as a Percent of Cost -----	33
III.	Selected Shipyard and % Composition of Labor Index -----	37
IV.	Compensation Adjustments -----	50
V.	Progress Payments -----	68
VI.	Profit Objective -----	86
VII.	Comparison of Estimated and Cost Incurred Progress for the 637-(4) Contract -----	104
VIII.	Profit Percentage -----	124
IX.	Percent Erosion of Target Profit (Based on Percentage Profit Listed in Table VIII.) ----	125
X.	Interest Charge and Adjusted Percentage Profit -----	126
XI.	Present Value of Profit @ 15% x (\$000) -----	127
XII.	Present Value of Deflated Profit @ 15% x (\$000) as a Percent of Target Cost ----	128





## LIST OF FIGURES

1.	Projected Escalation Payments as % of Initial Target Price -----	19
2.	Example Cost/Profit Diagram -----	78
3.	Cost/Profit Diagram, 688-LS Contract -----	89
4.	Cost/Profit Diagram, 688-I-(NN) -----	90
5.	Cost/Profit Diagram, 688-I-(EB) -----	91
6.	Cost/Profit Diagram, 688-II -----	92
7.	Cost/Profit Diagram, 688-III -----	93
8.	Cost/Profit Diagram, DLGN-36 -----	94
9.	Cost/Profit Diagram, DLGN-38 -----	95
10.	Cost/Profit Diagram, 637-(4) -----	96
11.	Cost/Profit Diagram, 637-(2) -----	97
12.	Cost/Profit Diagram, CVAN-68 -----	98
13.	Cost/Profit Diagram, TRIDENT -----	99
14.	Cost/Profit Diagram, AOR-7 -----	100



## I. INTRODUCTION

### A. PURPOSE

The purpose of this paper is to analyze the impact of inflation on profit in Navy Fixed Price Incentive Fee shipbuilding contracts. This is a current issue in the ship acquisition process as is evident in complaints of profit erosion raised by shipbuilders in response to recent Navy contract solicitations. For example, a shipbuilder states in the forwarding letter to a proposal submitted in response to the FFG-7 Follow Ship solicitation that the exclusion of profit from escalation coverage could erode profit as a % of cost by 30%. The shipbuilder further asserted that since the payment of profit is postponed to future periods where the dollar will be worth less profit is eroded by an additional 32%.

These are strong statements reflecting one shipbuilder's perception of how inflation affects profit. It is not intuitively obvious as to whether these statements are in fact valid. These statements do, however, imply that contractual provisions determine to a large degree the assessment of the impact of inflation on profit. Therefore, this thesis contains an examination of the relationship of



contractual provisions to the impact of inflation on the contractor's profit.

Profit can be viewed from separate perspectives. Two perspectives are either a "going-in" or "coming-out" basis. "Going-in profit," also referred to as "contract profit," is the amount of target profit stated in the contract at the time it is signed. "Going-in profit" can be stated in terms of a dollar amount or as a percentage of cost. "Coming-out profit," on the other hand, is the actual profit earned upon completion of the contract. In this paper statements regarding profit will refer to "going-in profit" expressed as a % of target cost unless stated otherwise.

It is also important that the reader note the distinction between price and cost. The price of a contract is comprised of two separate elements; cost and profit. Therefore, any reference to contract cost is exclusive of profit. In negotiated contracts, profit is determined by applying a percentage factor to contract cost. Although the government is primarily concerned with contract price or total contractor compensation, it is assumed that the distinction made between contract cost and profit is valid on a going-in basis.

Inflation can affect profit directly through the erosion of purchasing power or indirectly through the contractor



compensation methods. The analysis of the impact of inflation on profit is made within the context of those contractual provisions which determine contractor compensation. The principle provisions are the escalation and payments clauses. This paper is thus concerned with how and when the contractor is compensated in addition to how profit is to be measured.

The contractor has placed greater emphasis on the timing of the receipt of profit than has the government. The erosion of profit relative to the timing of profit can be measured in three ways. One measure addresses the reduction in purchasing power due to the increase in price levels while the other addresses the reduction in the value of profit as reflected by the opportunity cost associated with the receipt of profit over time. Assuming independence these can be combined into a third measure.

There are other factors which result in the erosion of profit such as the disallowance of cost in accordance with ASPR. These factors will not be included in the measurement of profit erosion.

## B. GENERAL APPROACH

In light of changes in policy regarding progress payments and escalation payments, an analysis was conducted





of selected contracts to determine the spectrum of provisions employed in shipbuilding contracts. Profit profiles for a subset of the selected contracts were developed based upon projections over time of expenditures and payments received as determined by the actual financial provisions contained in contracts. Three measures of profit erosion were used. Profit was measured in terms of deflated dollars, present value at 15% and present value of deflated dollars at 15%.

An outline of the general approach used to analyze the impact of inflation on profit is as follows:

1. Identify the principle components of contractor compensation such as progress payments, escalation payments, delivery payments, etc., and review the development of current Navy policy relevant to these components.

2. Trace Navy policy as actually implemented through the financial provisions contained in fourteen major shipbuilding contracts listed below.

3. Model the profit profile of selected contracts in light of the observed policies and using actual and projected inflation rates.

4. Using relative measures of profit make comparisons of the impact of inflation on profit for the contracts modeled in step three.



5. Develop alternatives to minimize the adverse impacts of inflation indicated in step four.

The following is a list of the fourteen major ship-building contracts selected for use in this paper.

Contract Designation	#vessels/ Class	Shipyard	Length of Contract (mo.)	Contract # N00024-
688-III	3/SSN 688	Newport News	79	-76-C-2031
TRIDENT	3/SSBN 726	Electric Boat	76	-75-C-2014
688-II	11/SSN 688	Electric Boat	87	-74-C-0206
AOR-7	1/AOR 7	National Steel	36	-73-C-0227
DLGN-38	3/DLGN 38	Newport News	69	-70-C-0252
688-I-(EB)	7/SSN 688	Electric Boat	78	-71-C-0268
688-I-(NN)	4/SSN 688	Newport News	66	-71-C-0270
688-LS	1/SSN 688	Newport News	45	-70-C-0269
DD 963	30/DD 963	Litton	96	-70-C-0275
637-(2)	2/SSN 637	Newport News	56	-69-C-0307
LHA	9/LHA	Litton	71	-69-C-0283
637-(4)	4/SSN 637	Electric Boat	57	-68-C-0343



DLGN-36	2/DLGN 36	Newport News	59	-68-C-0355
CVAN-68	2/CVAN 68	Newport News	Contingent on delivery of first vessel	-68-C-0325

For ease of identification, reference to contracts will be by contract designation rather than by contract number. Although reclassification of Naval vessels became effective 30 June 1975, the contract designation reflects the classification contained in the initial contract. The length of the contract listed above is based upon the delivery schedule at the time the contract was signed. Likewise, the number of vessels in the LHA contract is the original quantity. Twelve of the contracts represent the major new construction FPIF contracts listed in the Naval Sea Systems Command Monthly Progress Report dated 1 August 1975. The remaining two represent contracts that have recently been completed.

### C. ORGANIZATION

The organization of this paper relative to the steps outlined in the general approach is noted below:

Chapter II contains the analysis of contractor compensation and the development of current Navy policy which determines compensation.





Chapter III - V, respectively, contain the analysis of the escalation, payments and the cost incentive provisions that have been contracturally implemented. The tables contained at the end of each of these chapters describe the characteristics of the respective provisions contained in each of the selected fourteen contracts. The reader should become familiar with each table as there will be many references made to them throughout each chapter.

Chapter VI describes the procedures used to generate contract profit profiles.

Chapter VII contains the analysis of the profit profiles relative to the impact of inflation.

Chapter VIII introduces potential courses of action in light of the results obtained in Chapter VII.

The reader that is thoroughly familiar with contractual provisions used in Navy shipbuilding contracts may begin reading in Chapter VII where it is concluded that failure of the Navy to address the central issue of this paper will result in shipbuilders negotiating higher profit rates or a continuation of the decline in interest in Navy shipbuilding.



## II. CONTRACTOR COMPENSATION AS DETERMINED BY NAVY POLICY

Although there are many contractual provisions of a shipbuilding contract that affect contractor compensation such as liquidated damages, standardization, and early delivery incentives, compensation principally comes from four classes of payments. These four classes are as follows:

Escalation Payments

Progress Payments

Delivery Payments

Guarantee Payments.

Each of these classes will be introduced in this chapter. As each of the classes of payment is discussed specific issues are identified. Combined with increased inflation the result of these effects is that profit bid rates on Navy shipbuilding contracts have noticeably increased. A table listing profit rates bid on Navy contracts accompanied by a discussion regarding industry reaction to Navy policy is included in this chapter.



## A. ESCALATION PAYMENTS

Due to the long-term nature of shipbuilding contracts, the Navy has long been one of the major users of escalation clauses. Escalation or economic price adjustment provisions are explicit contractual procedures used to remove the effect of price level changes from contract price. Professors Sovereign and Jones in a paper entitled "Escalation Provisions for Navy Contracts: Issues and Choices," theoretically demonstrate that the removal of price level uncertainty from long-term contracts through an escalation provision is to the advantage of both parties. It should not be assumed, however, that the use of price adjustment clauses results in a total shift of risk relative to price level change from the seller to the buyer. For example, the Navy, in the acquisition of ships, uses one of the types of economic price adjustment provided for by ASPR. It is known as the labor and material cost index method. The adjustments in price determined by this procedure do not provide coverage for the escalation of profit. Since escalation provisions do not cover profit, the extent to which escalation payments comprise contractor compensation is indicative of the degree to which this should be of concern.

The increased rate of price level changes experienced since the late 60's has resulted in a significant shift in



the percentage of total compensation paid in the form of escalation payments. Figure I illustrates the magnitude of this shift relative to twelve major shipbuilding contracts signed since 1967. It can be seen that exclusive of aircraft carrier procurement, escalation payments on multi-vessel construction contracts signed prior to 1970 fall within a range of 10-20% of initial contract price whereas projected escalation payments on multi-vessel contracts signed since 1970 fall within a range of approximately 20-45% of initial contract price. Aircraft carrier procurement represents a special case due to the extremely long construction period. On the other hand, the multi-vessel distinction excludes the two single-vessel contracts, AOR-7 and 688-LS. Without the multi-vessel distinction these contracts would contradict the above statement. The distinction between the two contracts and the others is due to their relatively short construction periods. It should be noted, however, that even the projected percentage of escalation payments on these two contracts exceeds that of multi-vessel contracts such as the 637.

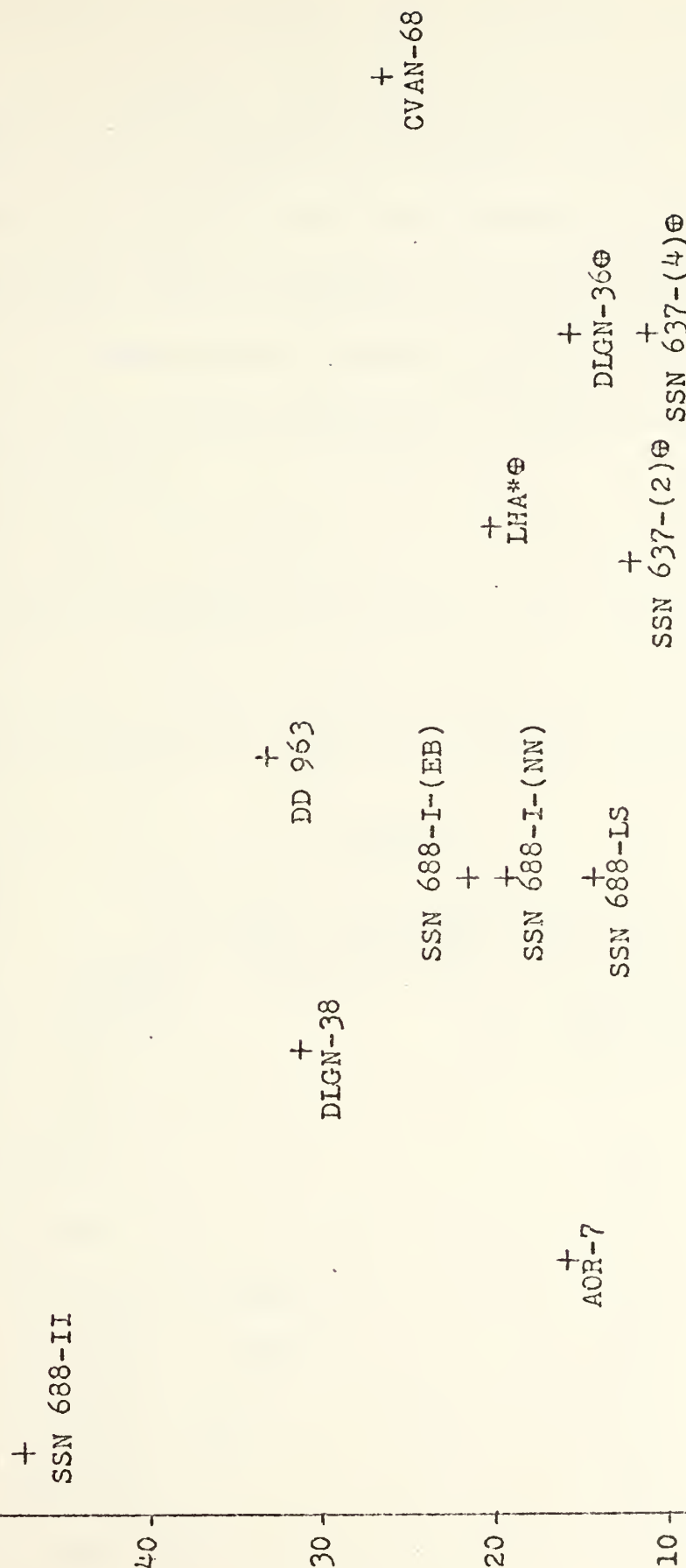
Figure I contains percentages based on both actual and projected escalation payments. The contracts which are completed for escalation purposes and thus based upon actual data are so indicated. As will be described in





Figure 1

Projected Escalation Payments as % of Initial Target Price (⊕ Actual)



Source: NAVSHIPS 7303-17 Reports

\*Reset (Contracting Officer's Decision)



Chapter III, it is possible for escalation coverage to end prior to physical completion of the contract. An example of this situation is the LHA contract. The use of projections of total escalation payments to substantiate the statement above regarding the shift in composition of contractor compensation requires an indication of the sensitivity of total escalation to changes in projected inflation rates.

One means of indicating the sensitivity of projected escalation to changes in projected price levels is the amount of escalation already incurred relative to the total projected escalation. Table I is such a presentation.

Table I

Escalation Incurred as a Percent of Total Projected Escalation (Source: NAVSHIPS 7303 - 17 Reports )	
<u>CONTRACT</u>	<u>% Escalation already incurred</u>
SSN 688 - II	9
AOR - 7	60
DLGN - 38	58
SSN 688 - I (EB)	48
SSN 688 - I (NN)	70
SSN 688 - LS	86
DD 963	74
CVAN - 68	90



Since only 9% of projected escalation has been incurred in the 688-II contract, it is the only contract in which the total projected escalation payments are highly dependent upon the estimation of future price levels.

The change in the composition of contractor compensation has prompted comments from shipbuilders concerning profit erosion. An example is provided by officials of Bath Iron Works Corporation in a presentation to Deputy Secretary of Defense Clements and CNO Admiral Holloway with regard to the FFG Follow Ship Program. (1).

The contractor is paid no fee on escalation, even though the contractor must assume the risk that escalation recovery will, in fact, make him "whole," and that represents a major potential cost as illustrated in this viewgraph. This factor alone erodes fee on cost from 13% to 9%. Therefore, we feel consideration should be given to fee on escalation.

This position is not without precedent. The Logistics Management Institute in a report entitled Wage Rate and Material Price Level Adjustment Provisions in DOD Procurement concludes, "...that an increment of profit on the escalation should be included in the adjustment." (2). Professors Sovereign and Jones also maintain this position. Likewise the Council of Defense and Space Industry Associates in a letter to the Chairman of the ASPR Committee proposed an escalation clause which provided for the adjustment of costs including a negotiated profit allowance allocated to those adjusted elements of cost. (3).



The Navy, in its use of escalation clauses is not uniform in the treatment of profit on escalation. The Commander, Naval Ship Systems Command in a letter to the Assistant Secretary of the Navy (I&L) concludes upon comparison of the NAVAIR and NAVSHIPS escalation clauses that "...the only substantial difference between the NAVAIR and NAVSHIPS clauses lies in the fact that NAVSHIPS does not pay escalation on profit or on fixed overhead whereas NAVAIR does."

(4). The above difference principally arises from the interpretation of the meaning of "total recognized contract costs" within the "weighted guidelines" procedure of ASPR as to the inclusion of normal escalation. The Chief of Naval Material in a letter to the Commander, Naval Sea Systems Command, regarding profit objectives on shipbuilding contracts states: (5)

In the past the difference between profit objectives computed with and without including normal escalation in the 'total recognized contract costs' was probably within a reasonable range of variance resulting from the judgmental application of weight ranges in the profit factors used. However, with the advent of increasing lead times and higher rates of economic escalation, the amounts of normal escalation have increased to the point where some consideration should be given to including them in recognized costs.

Accordingly, it is requested that the issue be evaluated and a NAVSEA position with supporting rationale be forwarded to the Chief of Naval Material by 30 April 1975.





The NAVSEA response to this request is included as Appendix A of this paper. Indicative of additional high-level concern on the subject of consideration of inflation in FPI and CPIF contracts is a memorandum to the Deputy Assistant Secretary of Defense (Procurement), the Director of Procurement, Office of the ASSTSECNAV (I&L) states: (6)

The effect of inflation on contractor profit under CPIF and FPI contracts warrants a detailed review of data on contractor cost experience. This subject is properly a subject of the 'Profit-76' study being performed by your office. It is recommended that the profit study examine data on contractor profit experience as a result of inflation on CPIF and FPI contracts.

The uncertainty reflected in the above statement as to the impact of escalation provisions on "coming-out profit," stems primarily from the artificial nature of their approach to the measurement of price level changes. Artificial in this context refers to the separation between the method of determining escalation payments and the actual cost experience of the contractor. This will be explained further in Chapter III. Due to this artificial nature, Secretary Bowers, ASN (I&L), proposed that the Chief of Naval Material establish a set of objectives for an optimum escalation system. (7). The increased rate of price level change combined with longer lead times encountered in the '70's led to a situation in which escalation provisions were



deemed inadequate by most shipbuilders. The primary reason for this contention was that the provisions did not provide protection beyond target cost and target schedule. The LMI Report had addressed these issues in 1968. Likewise, the Navy Marine Corps Acquisition Review Committee (NMARC), in its January 1975 report, addressed the issue of economic escalation. The NMARC Cost Panel in Recommendation COST - 66 stated: (8)

The Navy should complete MAT-02's effort to develop escalation clauses for shipbuilding contracts that will provide protection to contractors for economic escalation. Recognition must be given to the fact that these clauses must have the basic flexibility to be modified as required to suit the particular circumstances of various types of procurements. These clauses should provide for divorcing the effect of escalation from the basic risk-sharing arrangements of fixed-price-incentive-fee (FPIF) contracts by providing protection to ceiling. They should also consider extending the application to cost-type contracts. In addition, it would appear necessary for the Navy to encourage the flowdown of escalation provisions to subcontractors when the prime contractor has such protection.

The result of MAT-02's effort culminated in a fundamental change in the method of providing for escalation coverage. As will be noted later, this method was first utilized in the 688-III (third flight) contract. Escalation provisions will be analyzed in detail in Chapter III.



## B. PROGRESS PAYMENTS

The largest portion of shipbuilding contractor compensation is in progress payments. In recognition of delayed delivery payments under long-term construction contracts, ASPR-E-501 exempts shipbuilding from the usual E-500 requirements and authorizes the use of progress payments based on physical progress. Under physical progress payments the shipbuilding industry was able to receive up to a maximum of 105% of cost while other production industry contractors were limited to progress payments based upon 80/85% of cost. This difference provided the basis for complaints of preferential predelivery financing of the shipbuilding industry. However, in the summer of 1971, there occurred two events which have had a significant impact upon Navy policy regarding shipbuilding progress payments.

First, the Report of the Industry Advisory Council Subcommittee to Consider Defense Industry Financing dated 11 June 1971, recommended that an in-depth study be conducted of progress payments based upon a percentage or stage-of-completion. Second, was VADM Rickover's memorandum of 14 July 1971 to the ASN (I&L) criticizing existing progress payment policies and practices. He stated that Newport News was receiving progress payments far greater



than it needed to meet its cash outlays and that they had increased their cash surplus by taking advantage of loopholes in the Navy's progress payments process. The excess of progress payments over costs on Newport News shipbuilding contracts as of 9 July 1972 was cited as \$9.2 million. Such practices as paying subcontractors progress payments at only 90% of the amount billed the Navy and changing the method of calculating progress payments during the DLGN-36 contract were listed as examples of exploitation of loopholes in the progress payment process. In the latter instance it was stated that Newport News was able to claim additional progress payments of about \$3 million, when under the old method they would have had to refund \$900,000 in overpayments. Although the mechanics of the progress payments procedure will be discussed in a later section, it is of interest to note that the Deputy Chief of Naval Material (Procurement and Production) defended the additional progress payments to Newport News as funds to which the contractor was entitled to under the terms of the contract. In a memorandum to the ASN (I&L) he stated that the contractor had been under-billing as a result of a mistake in calculation of his entitlement for escalation and that DCAA had concurred in the revised method. (9). Further review of this matter led to an eventual reversal of this position.





The most immediate impact of VADM Rickover's memorandum was a NAVMAT requirement that the Contract Finance Committee approve of any contract provision permitting progress payments in excess of 80%. The longer range impact was that the charter of the Task Group to Study Shipbuilding Progress Payments incorporated the essence of the memorandum in its areas for inquiry and examination. The Deputy Comptroller of the Navy in a memorandum to the Task Group, highlighted Navy policy regarding progress payments as follows: (10).

A basic premise to the study is that progress payments or predelivery payments made by the Government are for the purpose of providing working capital for contract performance. This is a principle accepted by the Industry Advisory Council and is consistent with the views within the Department of Defense. By contrast, progress payments are not for the purpose of financing capital investment, not specifically included in the contract such as: land, buildings and equipment or to abate the payment of interest on contractor borrowings as an indirect means of bolstering profits.

The Task Group, in the summary of their report, stated the method of providing progress payments on shipbuilding contracts did not: (11).

1. Provide an accurate measure which can be efficiently and effectively administered,
2. Require contractors to have a positive investment in shipbuilding contracts,
3. Provide equal treatment with respect to the manner in which progress is measured,



4. Provide comparable treatment for shipbuilding contracts and other supply type contracts.

The Task Group recommended a cost-based method of making progress payments which introduced ASPR-E-500 constraints upon the shipbuilding industry. The proposed method was the same as that used with supply, aerospace and other non-construction industry contractors with the exception that seven additional interim payments based upon milestones of accomplished performance were to be included. In response to the Draft Report of the Task Group, the Commander, Naval Ships Systems Command stated: (12).

I am much concerned over the effect that the proposed change in our system of progress payments will have on the ship acquisition process. Undoubtedly, the extra costs of financing will result in higher costs for ship construction and conversion.

He proposed instead a continuation of the system based upon physical progress with a limitation of 95% of costs incurred in lieu of the 105% limitation. As illustrated in the report, a comparison of the financing provided by using the Task Group proposal with using progress payments based on 95% of incurred costs revealed the two methods to be quite similar in results. The Naval Ships Systems Command proposal was not tantamount to a rejection of the premise upon which the Task Group recommendations were based, but



rather reflected administrative considerations in light of the contract administration process.

On 15 March 1973 the recommendations of the Task Group were implemented in SECNAVINST 7810.11 with the intent to equalize the progress payments received by shipbuilders with those received by other defense contractors and to increase the shipbuilder's investment in work-in-process. As will be illustrated in the section on progress payments, the Navy was unsuccessful in imposing this payment method in any major new construction contracts. New construction contracts signed subsequent to the issuance of this instruction provided for continued use of payments based on physical progress with total payment limited to 95% of incurred costs as provided by the Commander, Naval Ships Systems Command. The validity of the comparison made by the Task Group was questioned in light of the extremely negative nature of the objections to SECNAVINST 7810.11 by the shipbuilding industry regarding the projected impact upon cash flow. An analysis of this matter by NAVMAT indicated that the method of SECNAVINST 7810.11 provided a lower level of progress payments than the 80% progress payments under supply type contracts. (13).

The Navy Marine Corp Acquisition Review Committee (NMARC) also studied the problems in the area of the



shipbuilding cash flow/progress payments. In their report they made, along with others, the following recommendation: (8).

The effectiveness of SECNAV Instruction 8710.11 in its present form is questionable in the judgment of the Panel. The current Navy study should be completed; policies for financing, contractor investment, and profit should be defined; and modification of SECNAV Instruction 7810.11 should be effected to achieve practices that are equitable and realistic in view of the current economic environment.

The Director of Banking and Contract Financing, in a memorandum to the Assistant Secretary of the Navy, (Financial Management) called the timing of SECNAVINST 7810.11 inappropriate. He stated that the long-term effect would be either in ship price or a further diminution in opportunity for profits (due to the regulation prohibiting the cost of borrowed funds as an expense item for work on Government contracts). Concluding that neither ship price increase nor profit diminution was desirable, he recommended that SECNAVINST 7810.11 be recinded and that progress payments based upon physical progress be continued. (14).

On 17 July 1975 SECNAVINST 7810.11 was cancelled by SECNAVINST 1810.12 authorizing progress payments based upon a percentage-of-completion for fixed price and fixed price incentive shipbuilding contracts. This essentially was a modified version of the previous long established method of





progress payments with an explicit treatment of incurred costs. Payments provisions will be analyzed in detail in Chapter IV.

### C. DELIVERY AND GUARANTEE PAYMENTS

Delivery and guarantee payments, like progress payments, are covered by the payments article of a shipbuilding contract. The delivery payment is made upon preliminary acceptance of a vessel while the guarantee or performance reserve payment is made after the guarantee period. Generally the guarantee period is six months after completion of the fitting out period or eight months after preliminary acceptance. The Task Group to Study Shipbuilding Progress Payments noted that the guarantee payment frequently is made an unreasonable length of time after expiration of the guarantee period. The guarantee payment is defined as 2% of the vessel price. The delivery payment is the amount withheld from progress payments less the guarantee payment. However, not until the 688-II contract were delivery payments exempt from the percentage of cost ceiling applicable to total payments. This has prohibited the payment of full delivery payments in those instances where progress payments have become cost limited. The DD 963 contract is an example of this situation. These payments will be included in the analysis of payments provisions in Chapter IV.



#### D. MARKET IMPLICATIONS

This section would be incomplete without reference to the changing nature of the shipbuilding industry. There has been a significant shift in both the number of major vessels under construction and the number of private yards engaged in Navy shipbuilding. The Shipbuilders' Council of America data indicates that in 1964 there were 14 shipyards building 83 Navy vessels while by 1974 the number of shipyards had dropped to six and the number of vessels to 66. During this same period merchant vessel construction increased from 49 vessels in nine shipyards to 97 vessels in nineteen shipyards.

The change in total workload has been accompanied by a change in the structure of the industry. All but two of the major private yards have become part of large multi-division corporations. Capital investment has increased from \$130,000,000 in the period 1964 - 1966 to a projected \$510,000,000 for the 1973 - 1975 time frame. (13). This change in structure and increase in investment have been contributing factors leading to increased attention paid to financial matters such as cash flow, return on investment and claims against the government. The above factors and



others are reflected in contract profit rates bid by major private shipbuilders for the construction of Navy vessels.

Table II

Contract Profit Rates Bid by Major Private  
Shipyards as a Percent of Cost

<u>Ship- yard</u>	<u>1965</u>	<u>'66</u>	<u>'67</u>	<u>'68</u>	<u>'69</u>	<u>'70</u>	<u>'71</u>	<u>'72</u>	<u>'73</u>
A	5	5	10.5	10	10				
B	5	5		12	12	11		12	12
C	8	5	11.5	10	10	10	13	13	13
D	2.5	2.5	2.5	9	11	10		12	
E	5	5	9						
F	10	10	10					9	
G	5	6	8					10	

Source: NAVSEA 01G

Although the above table indicates that a change in policy concerning profit rates occurred during 1967 - 1968, shipbuilders have testified before the Seapower Subcommittee regarding the low profitability of their Navy ship construction business. Among other factors, increased demand for commercial work and low profitability on Navy work have caused some shipbuilders to adopt corporate policies of ridding themselves of dependence on Navy contracts. However,



other yards which have become deeply committed to Navy work and are, in the words of Litton President Fred O'Green, "bidding on Navy contracts because we have no choice."

Recent major ship acquisition actions have been received with little interest on the part of the shipbuilding industry. The AS 39/40 procurement resulted in only one response to the solicitation. In the AD 40 procurement no response to the solicitation was received. The FFG-7 Follow Ship solicitation, in which the intention was to make awards to three separate shipyards, resulted in proposals from only three shipyards. Two of these belong to the same corporation. On the other hand, the Navy faces a limited number of private shipyards qualified to construct nuclear surface ships and submarines. Present and projected nuclear shipbuilding is concentrated in only two shipyards; Newport News Shipbuilding and Dry Dock Company and General Dynamics' Electric Boat Division. Newport News maintains the only active capability to construct nuclear surface ships whereas Electric Boat, which holds the contract for the first three TRIDENT submarines, depends entirely upon Navy submarine construction, conversion, overhaul, and repair work. If the Navy is to meet its five year shipbuilding goal, it must recognize the interdependence that exists between it





and the three shipyards that presently account for the majority of Navy vessels now under construction or contract.

This chapter has discussed the development of current Navy policy which determines, to a large extent, the impact that inflation will have on profit. Contractor compensation has been divided into specific classes of payments which in turn have been identified with applicable policy. The specific contractual provisions used to implement the policy that has been identified will be the subject of the next two chapters.



### III. ESCALATION PROVISIONS

The use of escalation provisions was introduced in Section A of Chapter II. This chapter will analyze the mechanics of the escalation provisions used in major ship acquisitions. A comparison will be made of the escalation clauses contained in fourteen shipbuilding contracts.

Since 1962 escalation clauses used in Navy shipbuilding contracts can be classified as one of two types. These two are referred to as the 1962 standard clause and the 1975 clause or Marshall clause. As noted earlier both clauses provide for price adjustment based upon the cost index method. Both clauses rely upon two indices published monthly by the Bureau of Labor Statistics (BLS) as measures of price level changes. These indices are referred to as the BLS material and labor indices.

#### A. BLS INDICES

The BLS steel vessel material index is made up of three commodity subgroups of the wholesale price index chosen to be most representative of shipbuilding. The three subgroups are weighted on the basis of the breakdown that existed for a typical commercial ship in 1952. The subgroups and respective weightings are as follows:



<u>Subgroup</u>	<u>Weighting</u>
10-1 Iron and Steel	45%
11-4 General Purpose Machinery	40%
11-7 Electrical Machinery	$\frac{15\%}{100\%}$

Since Steel Mill Products comprise 72.4% of the 10-1 subgroup and, therefore, 33% of the total, the BLS material index is sensitive to movement in the price of steel plate.

The BLS labor index is composed of inputs from eighteen private shipyards. The index is based upon the straight-time average hourly earnings reported by the yards. The shipyards and their respective representation is shown in Table III as of June 1975. (15).

Table III

Selected Shipyard and % Composition of Labor Index

<u>Yard Name</u>	<u>% of total reported employees</u>
Bath Shipbuilding	4.4
G.D. Groton	19.6
Newport News	28.1
American	1.1
Defoe	0.2
Dravo	1.4
Marinette	0.5



Avondale	8.3
Bethlehem (Texas)	2.7
Levington	2.3
Litton	15.4
Bethlehem (San Francisco)	0.8
Gunderson	1.6
Lockheed	2.2
National Steel	5.4
Todd (San Pedro)	3.7
Todd (Seattle)	1.9
Williamette	0.3

#### B. 1962 STANDARD CLAUSE

Appendix B is an example of the 1962 standard escalation clause. It should be read by those not familiar with this type of clause prior to reading the remainder of this chapter.

The 1962 standard clause provides for escalation payments according to the following formula:

$$\text{Escalation payment} = \left[ \frac{\text{BLS}_i - \text{BLS}_0}{\text{BLS}_0} \right] \times E_i \times C \times TC$$

where:  $\text{BLS}_i$  is the average value of the appropriate index for period  $i$ .

$\text{BLS}_0$  is the value of the appropriate index for the base month specified at the time of pricing.





$E_i$  is the percentage of total labor or material cost apportioned to period  $i$ .

$C$  is the labor or material percentage of target cost subject to escalation.

$TC$  is the target cost.

Separate calculations are made for labor and material. Because change orders are priced exclusive of the escalation provisions, the total escalation payments for labor and material equals:

$$\sum_{i=1}^n \left[ \frac{BLS_i - BLS_o}{BLS_o} \right] \times E_i \text{ (labor, material)} \times C \times TC$$

where:  $n$  is the number of periods of escalation coverage.

The expenditure curves for labor and material ( $E_i$ ) are determined by the Navy based upon an analysis of the historical data of the anticipated bidders, labor/material mix, material lead times, and fabrication requirements of the type of ship. The percent of target cost subject to escalation ( $C$ ) for labor and material is exclusive of those projected overhead costs which are fixed. The expenditure curves and labor/material mix provided in the solicitation are, therefore, only an estimation of what will be achieved by a representative shipbuilder.



Shipbuilders approach pricing by estimating costs based on current prices and by taking into account the differences between their estimates and the government's estimated expenditure curves and labor/material mix. They make adjustments to their bid prices based upon their best judgment as to the difference between their projection of cost escalation and the amount they expect to be returned in escalation payments.

With the exception of sole-source procurements, the initial labor/material mix and the expenditure curves are not subject to adjustment during the negotiation process. If a cost analysis is performed, competition notwithstanding, the basis for the contractors' price adjustment may become an issue for cost negotiations. In the event that the government is unsuccessful in eliminating this contingency for uncollectable escalation, a negotiating practice is to exclude the contingency from the target price but include it in the cost-sharing incentive and ceiling price. In sole-source procurements the initial labor/material mix and expenditure curves are subject to negotiation. Additionally, in specific instances modifications have been made to the labor indices to provide an adjustment for the difference between the historical performance of the BLS labor index and the experience of the contractor. As will be noted



later in this chapter, both the CVAN-68 and the DLGN-38 contracts provide for the adjustment of the BLS labor indices through the use of a multiplier.

In all cases once the contract is signed the predetermined expenditure values ( $E_i$ , C, and TC) remain fixed for the duration of the contract and are subject to adjustment only in the event of partial termination. Because escalation payments under the 1962 standard clause depend on these predetermined values and the movement of the two BLS indices they are largely independent of the actual cost experience of the contractor. This separation of the basis for making escalation payments from the actual experience of the contractor was the target of the criticism noted earlier.

The shipbuilder faces four elements of risk associated with this method. First, the actual expenditures may occur at a later time than reflected in the predetermined curves. This will result in undercompensation for actual escalation in periods of inflation and overcompensation in periods of deflation. Delivery delays usually experienced in Navy shipbuilding underscore the likelihood that expenditures will occur at a later time than reflected in the predetermined curves. Second, the predetermined labor/material mix may



not be achieved. Third, escalation is not paid on costs incurred between target and ceiling rather only on the pre-determined percentage of target cost. Fourth, the index may not reflect the actual price level change experienced by a particular contractor for a particular ship. The 1975 clause was developed in response to the first three risk elements.

The combined impact of these four elements is by no means clear. For example, undercompensation resulting from the first three elements could be offset through overcompensation due to the inapplicability of the material index. Lt. D. D. Geismar, in a thesis entitled "Composition of Material Price Indices for Naval Ship Contract Escalation," compared escalation payments on the DD 963 contract using both the BLS and an index representative of the unique material composition of that class vessel. He demonstrates that for some ships substantial overcompensation or undercompensation may result if the weighting of individual components of the BLS steel vessel index is not representative of the contractors costs. (16).

#### C. 1975 CLAUSE

The 1975 clause involves the de-escalation of actual incurred costs to determine both the amount and timing of





escalation payments. Payments under this method are determined according to the following formula:

$$\text{Escalation Payment} = AC_i - AC_i \times \frac{BLS_o}{BLS_i}$$

where:  $BLS_i$  is the value of the appropriate index for period  $i$ .

$BLS_o$  is the value of the appropriate index for the base month specified at the time of pricing.

$AC_i$  is the actual escalatable cost incurred in period  $i$ . (Escalatable cost is defined in the next paragraph.)

Separate calculations are made for labor and material.

The total escalation payments for labor and material equal:

$$\sum_{i=1}^n AC_i - AC_i \times \frac{BLS_o}{BLS_i} \quad (\text{labor, material})$$

where:  $n$  is the number of periods until actual delivery.

As in the 1962 standard clause, the percentage of costs to be escalated is predetermined. The measurement of fixed overhead costs for escalation purposes is subject to a high degree of uncertainty. The result is that fixed costs are subjectively defined in the contract as a percentage of indirect costs. Therefore, escalatable costs are defined in terms of direct material, direct labor, and a fixed



percent of indirect costs. The major improvement over the previous method is that under the 1975 clause escalation payments are based upon the actual timing of incurred cost and the payments continue until delivery. The continuation of escalation payments beyond the contract delivery date, however, is contingent upon two stipulations. First the sum of total de-escalated costs and all costs incurred not subject to escalation may not exceed the ceiling price. Second a ceiling is placed on the BLS indices at some point after the contract delivery date. It is anticipated that the 1975 clause will replace the 1962 standard clause.

#### D. COMPARISON OF ACTUAL ESCALATION PROVISIONS

The remainder of this chapter will be an analysis of the escalation provisions contained in the fourteen contracts listed in Chapter I.

Contracts signed prior to and including the 688-II provide escalation payments based upon the 1962 standard clause. The clause contained in the TRIDENT contract represents the transition between the two methods discussed in this chapter. The 688-III contract represents the first application of the 1975 clause. However, there have been significant variations in the application of the 1962 standard clause. Table IV provides a comparison based upon nine common characteristics.



One of the major variations among the clauses analyzed was in the designation of the percentage of costs upon which escalation would be paid. Costs subject to escalation varied from 100% of actual cost incurred in the 688-III contract to 79.7% of target cost for the 637-(2) contract. It should be noted that in the 637-(4) and DLGN-36 contracts costs subject to escalation are designated as a % of target price rather than target cost as was the common practice. Conversion of the escalation base to a percent of target cost results in percentage of 86.9 and 94.9 respectively.

In two instances separate provisions were included to provide escalation coverage for a specific element of cost. Escalation on designated employee benefit program costs in the CVAN-68 contract was to be paid based upon actual increases in costs with a maximum increase of \$1.25 per hour for the life of the contract. Energy cost elements on the 688-III contract are excluded from indirect costs and are covered by separate escalation provisions.

The use of base cost as a means of designating escalatable cost in the DLGN-38 contract represented a major departure in the degree of escalation coverage provided under the 1962 standard clause. The base cost is defined as the final projected cost determined under the revised billing base procedure. Under this procedure, base cost



was revised quarterly based upon the quotient of total incurred cost and physical percentage of completion. This, in effect, provided for the payment of escalation on costs between target and ceiling. This degree of escalation coverage was not provided for again until the TRIDENT contract. Adjustments to the costs covered by the escalation provisions in the TRIDENT contract were not to be made at regular intervals but when projected final cost was "substantially greater or smaller than target cost."

Two other contracts containing the 1962 standard clause provided for adjustment to the costs covered by the escalation provisions. These two were the successive target type of contract used in the acquisition of the LHA and DD 963. The escalation clause contained in these two contracts provided for a one-time adjustment in costs based upon the establishment of a firm target cost. It should be noted that these two contracts were the result of Total Package Procurement and as such are different from the other FPIF contracts used in ship acquisition.

The TRIDENT contract was the first contract in which the expenditure curves could be adjusted if the actual expenditures differed substantially from the curves provided. The CVAN-68 contract did, however, provide for adjustment of the expenditure curve in the event that the first vessel





was delivered early. This most likely was a result of the uncertainty reflected in the delivery schedule. Delivery of the first vessel was specified to occur within a time band spanning sixteen months. As a result of the provision to adjust the expenditure curves the TRIDENT contract was the first to provide for escalation payments beyond the contract delivery date.

The DLGN-38 and the CVAN-68 contracts contain provisions which apply a multiplier of 1.25 and 1.26 respectively to the BLS labor index. This, in effect, provides for the payment of the actual increases in labor costs resulting from increases in rates provided they do not exceed payments based upon the BLS index as increased by the multiplier.

The TRIDENT contract represents another variation in the application of the BLS indices. The material index used was one proposed by the contractor and is comprised of seventeen wholesale price indices of lower-level BLS commodities. Initial experience with the index has thus far shown it to reflect a lower level of price change than that of the BLS material index for steel vessel contracts.

The frequency of escalation payments has increased from quarterly to weekly. Although the BLS indices are published monthly, weekly payments in the 688-III contract are made



according to the average weekly escalation measured in the preceding month.

Prior to concluding this chapter one last subject pertaining to escalation remains. This subject is the length of time between the base month for pricing and the first escalation period designated in the contract. The first escalation period normally starts the first month after the date of the contract. In the DLGN-38 contract however, the first period was designated as the month following the base month for pricing. This period varied from one month in the DLGN-38 contract to eighteen months in the DD 963 contract. This period of time is a direct result of the contracting process. If an element of profit was included in the escalation provision this period would be of little consequence. Given current practice, the length of this period is a contributing factor in the erosion of profit as maintained by shipbuilders.

Based upon the above analysis it can be concluded that escalation coverage has not been provided on a uniform basis. Generally the coverage provided in contracts with Newport News has exceeded that of other contractors. The use of multipliers and other special provisions has resulted in a situation where for the same contractor similar elements of cost are afforded different escalation treatment.



Likewise the increased frequency of escalation payments has not generally been applied retroactively to other contracts. This has resulted in a significant variation in the working capital required to support the particular method of payment.

The overriding consideration regarding the impact of inflation on profit as a result of contractual escalation provisions is that profit is not included in escalation coverage. The analysis of contractual provisions continues in the next chapter with the emphasis on payments provisions.



Table IV

## Compensation Adjustments

Contract Date/Contractor	688-III 8/75 (NN)	TRIDENT 7/74 (EB)	688-II 10/73 (EB)	AOR-7 12/72 (NS)	DLGN-38 12/71 (NN) P00007
Based On					
Target Cost (TC)	Actual	93% TC	93% TC	94% TC	97.8% BC
Target Price (TP)	Costs	63% L	59% L	33% L	54.6% L
Base Cost (BC)	Incurred	30% M	34% M	61% M	43.2% M
Base Cost Adjusted	Monthly	Negotiated	No	No	Quarterly
Expenditure Curve Adjusted	NA	Negotiated	No	No	No
Escalation Beyond Delivery Date	Yes Index Ceiling 240 Days After Delivery Date	Yes	No	No	No
Limited by Ceiling Price	Yes (BC)	NO	No	No	No
Adjustment Based on - Base Month	BLS 5/74	BLS Special 11/73	BLS 7/72 L 12/72 M	BLS 4/72	BLS L X 1.25 6/70
Frequency of Payment	Weekly	Monthly	Quarterly	Quarterly	Quarterly
Payments Limited by Total Incurred Costs	100%/105%	100%	95%	95%	100%/105%
Index Publication Delay - Payments by Projection	Yes 3 Month Avg.	Yes 4 Quarter Avg.	Yes 4 Quarter Avg.	Yes* 4 Quarter Avg.	Yes 6 Month Avg.

\*Contract Modification





Table IV

## Compensation Adjustments

Contract Date/Contractor	688-I 1/71 (EB)	688-I 1/71 (NN)	688-LS 1/71 (NN) P00015	DD963 6/70 (L)	637-(2) 7/69 (NN)
Based On				Reset	
Target Cost (TC)	93% TC	93% TC	97.9% TC	93%TC	79.7% TC
Target Price (TP)	51% L	51% L	58.6% L	14%L	46.5% L
Firm Target Cost (FTC)	42% M	42% M	39.2% M	79%M	33.2% M
Base Cost Adjusted	No	No	No	@ Reset	No
Expenditure Curve Adjusted	No	No	No	No	No
Escalation Beyond Delivery Date	No	No	No	No	No
Limited by Ceiling Price	No	No	No	No	No
Adjustment Based on - Base Month	BLS 4/70	BLS 4/70	BLS 4/70	BLS 1/69	BLS 1/69
Frequency of Payment	Quarterly	Quarterly	Quarterly	(Quarterly) Monthly*	Quarterly
Payments Limited by Total Incurred Costs	105%	105%	105%	105%	105%
Index Publication Delay - Payments by Projection	Yes* 4 Quarter Avg.	Yes* 3 Month Avg.	No	Yes* 3 Quarter Avg.	No

\*Contract Modification



Table IV

## Compensation Adjustments

Contract Date/Contractor	LHA 5/69 (L)	637-(4) 6/68 (EB)	DLGN-36 6/68 (NN)	CVAN-68 3/67 (NN)
Based On	Reset			
Target Cost (TC)	85% TC 92% FTC	78% TP	84% TP	96.47% TC
Target Price (TP)	20% L 48% L	44.9% L	46% L	51.05% L
Firm Target Cost (FTC)	65% M 44% M	33.1% M	38% M	45.42% M
Base Cost Adjusted	@ Reset	No	No	No
Expenditure Curve Adjusted	No	No	No	If Early
Escalation Beyond Delivery Date	No	No	No	No
Limited by Ceiling Price	No	No	No	No
Adjustment Eased on - Base Month	ELS 7/68	ELS 11/67	ELS 6/67	ELS L X 1.26 6/67
Frequency of Payment	(Quarterly) Monthly*	Quarterly	Quarterly	Quarterly
Payments Limited by Total Incurred Costs	105%	105%	105%	105%
Index Publication Delay - Payments by Projection	No	No	No	Yes 6 Month Avg.

\*Contract Modification



#### IV. PAYMENTS PROVISIONS

Navy policy regarding progress payments was introduced in Section B of Chapter II. This chapter will introduce the mechanics of the payments provisions used in major ship acquisitions. A comparison will be made of the payments clauses contained in fourteen shipbuilding contracts.

##### A. NAVSHIPS PAYMENTS CLAUSE

As noted earlier, progress payments for all Navy FPIF new construction contracts have been based upon physical progress. The 1961 NAVSHIPS payments clause, even if not actually used, has provided the basic framework for the clauses contained in these contracts. Due to the impact of this clause on shipbuilding payments provisions it is reprinted below as contained in the NAVSHIPS VESSEL FORM (July 1966).

8. PAYMENTS. -(a) (i) Until such time as the performance of the contract as a whole is fifty percent (50%) complete, the Government, upon submission by the Contractor of invoices certified by the Contractor as hereinafter provided, will promptly make payments on account of the total contract price of ninety percent (90%) of an amount determined by applying to the total contract price the percentage of physical progress in the performance of the contract as a whole as certified by the Contractor subject to the approval of the Supervisor; provided, that no such payment shall be made in an amount which when added to the total of all payments previously made exceeds the cost certified by the



Contractor on the related invoice to have been incurred by it in the performance of the contract plus five percent (5%) of such cost.

(ii) After the percentage of physical progress in the performance of the contract as a whole has reached fifty percent (50%), the Government, upon submission by the Contractor of invoices certified by the Contractor as hereinafter provided, will promptly make payments on account of the total contract price of one hundred percent (100%) of an amount determined by applying to the total contract price the percentage of physical progress in the performance of the contract as a whole as certified by the Contractor subject to the approval of the Supervisor, less five percent (5%) of the contract price as adjusted; provided, that no such payment shall be made in an amount which when added to the total of all payments previously made exceeds the cost certified by the Contractor on the related invoice to have been incurred by it in the performance of the contract plus five percent (5%) of such cost.

(iii) Invoices may be submitted semi-monthly or more frequently if expenditures by the Contractor warrant and shall be based upon the total contract price as adjusted from time to time pursuant to the clause of this contract entitled "Changes." No payment will be required to be made under this paragraph (a) upon invoices aggregating less than Five Thousand Dollars (\$5,000).

(b) Upon preliminary acceptance of each vessel and upon the submission of properly certified invoices, the Government will pay to the Contractor the amount withheld under paragraph (a) in excess of (i) two percent (2%) of the contract price for such vessel, as adjusted by change orders, constituting a performance reserve; and (ii) an additional reserve for final settlement of one percent (1%); provided, that such final settlement reserve shall not exceed One Hundred Thousand Dollars (\$100,000) for the entire contract. If at any time it shall appear to the Government that the amount of the performance reserve may be insufficient





to meet the cost to the Government of finishing any unfinished work under the contract for which the Contractor is responsible, or of correcting defects for which the Contractor is responsible developing prior to preliminary acceptance or during the guaranty period of any vessel, the Government may, in making payments under this clause, deduct or withhold such additional amounts as it may determine to be necessary to render such reserve adequate pending adjustment of the total contract price on account of such additional unfinished work and defects in accordance with the clause of this contract entitled "Changes." Any such additional amounts deducted or withheld on account of defects developing during the guaranty period of the vessel shall not exceed the limit of the Contractor's liability under the clause of the Special Provisions entitled "Limitation of Contractor's Liability for Correction of Defects."

(c) The Government shall, at the time of final settlement, in accordance with the provisions of the clause entitled "Final Settlement," pay the Contractor the balance owing to it under the contract promptly after the amount of such balance shall have been determined.

(d) The Government may, in its discretion, make payments prior to final settlement on account of the reserves established under this clause subject to such conditions precedent as the Contracting Officer may prescribe.

The predominant feature of the clause is that the procedure for determining progress payments is dependent upon the degree of progress on the total contract. The percentage of physical progress is determined according to procedures of the Ships Acquisition Contract Administration Manual (SACAM). This procedure involves the determination of physical progress on each vessel under the contract. The percentage on the total contract is the weighted sum



of the progress on each vessel. The clause provides for payment of 90% of progress based upon contract price during the first half and 100% of progress based upon contract price less 5% of contract price during the second half of the contract. Payments based on 90% of progress preclude the payment of any profit for those contracts with profit percentages below 11.1%. The relation of progress payments to the profit percentage when based upon 90% of progress is illustrated in Appendix C. It should also be noted that progress payments based on 100% of progress less 5% of contract price are not the same as those based on 95% of contract price. Furthermore, total payments are limited to a percentage of incurred cost. Total payments in this context refers to any payment resulting from the contract. This ceiling provides a link between the escalation clause and the payments clause.

It is important that the implication of the cost limitation on total payments be fully understood. In the above payments clause total payments may not exceed incurred costs by more than 5% until delivery of the last vessel. Therefore the payment of profit will not exceed 5% of incurred cost until completion of the contract. The use of a ceiling on total payments equal to 100% of incurred cost will, in the above clause, prevent the payment of any



profit until completion of the contract. A ceiling of 95% would require the contractor to finance 5% of the construction cost in addition to any other withholding stipulated in the payments clause. As will be demonstrated in a later chapter the ceiling on total payments has a significant impact upon the payment of profit.

As noted in Chapter II, there have been different interpretations regarding the computation of progress payments. As stated in the payments clause, invoices submitted in support of progress payments must contain a certification that the total of all payments received under the contract does not exceed the total cost incurred plus five percent of such cost. In the case of the DLGN-36 contract, Newport News in February 1971 changed its certification to read that the total of all payments exclusive of escalation payments does not exceed the total costs incurred plus five percent of such costs. The impact of this change in certification on progress payments can be illustrated through a hypothetical example. Throughout the example it will be assumed that total progress payments based upon physical progress exclusive of any ceiling on payments equals \$90.



Computation of Progress Payments with  
Certification that Total Payments do  
not Exceed 105% of Incurred Cost

Incurred Costs (Material, Labor and Overhead)	\$90.0
Plus 5%	<u>4.5</u>
Maximum Payments Based on Cost Plus 5%	\$94.5
Less: Escalation Payments to Date	<u>\$10.0</u>
Maximum Progress Payments Based on Cost plus 5%	<u>\$84.5</u>
Total Progress Payments Based on Physical Percentage of Completion	<u>\$90.0</u>

In the above example, progress payments would be limited to \$84.5. Combined with prior escalation payments, the total of all payments would be \$94.5 which equals 105% of cost.

Computation of Progress Payments with  
Certification that Total Payments Exclusive  
of Escalation Payment do not Exceed 105%  
of Incurred Cost

Incurred Costs (Material, Labor and Overhead)	\$90.0
Plus 5%	<u>4.5</u>
Maximum Payments Based on Cost Plus 5%	<u>\$94.5</u>
Total Progress Payments Based on Physical Percentage of Completion	\$90.0
Plus Escalation Payment to Date	<u>\$10.0</u>
Total Payments	<u>\$100.0</u>





In the above example the contractor certifies that the total payments exclusive of escalation payments (\$100.0 minus \$10.0) does not exceed 105% of costs (\$94.5). Total payments would be \$100 versus the \$94.5 in the previous example.

Newport News through adoption of this procedure was able to increase progress payments by almost 4 million dollars on the DLGN-36 contract. This method of determining progress payments was later interpreted to be invalid.

Other examples exist which further demonstrate misunderstanding regarding the calculation of progress payments. The Task Group to Study Shipbuilding Progress Payments found that Electric Boat was applying the payments provisions on an individual vessel basis. This in effect accelerated the receipt of progress payments relative to those based upon the total contract.

Recently an analysis substantiating a proposal submitted in response to the FFG-7 Follow Ship Solicitation revealed that the contractor had failed to apply the cost incurred ceiling in projecting progress payment receipts. Although there may be misunderstanding regarding the calculation of progress payments, there is none regarding the reason for withholding of some of the earned progress payment.



The withholding is designed to insure that the contractor maintains an investment in his work-in-process. The mechanics of the payments clause are easily explained in terms of this withholding. The 10% withholding during the first half of the contract provides for the gradual buildup of investment in work-in-process so that at the 50% completion point the level of investment has reached 5% of the contract price. This level is then maintained during the second half of the contract by withholding 5% of the contract price. This explanation assumes that the contractor makes favorable progress relative to cost. The cost limitation provides protection to the Navy against uncertainty involved in measuring physical progress.

There is, however, disagreement over the measurement of the contractor's investment in work-in-process. Investment in work-in-process can be separated into two elements, cash investment and earned profit. The Navy is uncertain as to when earned profit should be recognized with the result that contractor investment is interpreted to be cash investment. The misunderstanding regarding earned profit and cash flow is best illustrated in the following contradictory sentence contained in a letter to the Navy Comptroller from one of the Systems Commands.



Establishment of an upper limit not to exceed 100% of incurred cost plus earned profit to insure that no positive cash flow would result from cumulative progress payments.

Studies such as the Task Group to Study Shipbuilding Progress Payments have adopted cash flow as a measure of investment. This approach ignores completely the concept of earned profit.

Shipbuilders follow the practice of the construction industry and book profit based upon progress during the total life of the contract. They are quick to point out the tax liability resulting from profit that has been booked but not paid. They maintain that the current asset representing booked profit which has not been paid is an investment that is no different than the purchase of material which is then billed to a specific contract. From the Navy's viewpoint the former would not be considered investment in work-in-process while the latter would.

A problem of greater concern on the part of the Navy is the uncertainty that surrounds the final contract price. The premature payment of profit was a major concern in the development of current policy regarding progress payments. The uncertainty as to final contract price is the result of the cost-sharing incentive provision. Since progress payments are initially based on target price, unfavorable



physical progress relative to cost will have a serious impact on contractor investment and thereby endanger his ability to perform unless an upward adjustment is made to the contract price. One method to remedy this problem is the revised billing base procedure referred to in section D of Chapter III.

#### B. REVISED BILLING BASE

The revised billing base procedure is a provision contained in the payments clause which provides for the quarterly adjustment of the billing base. The billing base prior to the first quarterly adjustment is the contract price.

Adjustments in the billing base are for the purpose of making progress payments and do not affect the determination of the final contract price. The revised billing base is determined according to the following formula:

Revised Billing Base = Projected Final Cost + Projected Profit

where:

$$\text{Projected Final Cost} = \frac{\text{Incurred Costs} - \text{Escalation Payments}}{\% \text{ Physical Progress}}$$

The maximum projected final cost is limited to the contract ceiling price.

Projected Profit is the profit based upon the projected final cost as determined under the Incentive Price Revision Clause.





The above explanation represents the generalized case. The exact procedure for determining the projected final cost varies depending on the escalation clause contained in the contract.

The revised billing base is the price from which progress payments are calculated. Thus the revised billing base procedure provides a systematic method by which the cost incentive is applied to the projected final cost in order to determine the price upon which to make progress payments. The revised billing base procedure has been used in only three contracts, the CVAN-68, DLGN-38, and 688-III, all with Newport News. The predominant method for making adjustments in the billing price is through a provision contained in the incentive price revision clause which provides for negotiation of a change in the billing price when it can be demonstrated that the final cost will be substantially different than target cost. Negotiated changes in billing price occur on an infrequent basis. The revised billing base procedure provides a superior method for making adjustments in the billing price.



### C. COMPARISON OF ACTUAL PAYMENTS PROVISIONS

The remainder of this chapter will consist of a comparison of the payment clauses contained in the fourteen contracts listed in Chapter I. A comparison based upon common characteristics is provided in Table V.

The CVAN-68, DLGN-36, LHA and 688-III contracts provide for payments based on an individual vessel basis. This resulted in exempting delivery payments from the 105% cost ceiling in the CVAN-68 and DLGN-36 contracts. The LHA payments clause, however, was written such that the ceiling on total payments was applicable to all payments made under the contract. Starting with the 688-II contract the exclusion of delivery payments from the cost ceiling became a permanent provision of the payment clause.

The payment provisions when applied on an individual ship basis increases total progress payments during the first half of the contract. This is not the case in the CVAN-68 contract as payments are based on 95% of progress for the entire contract. The exception to the use of the NAVSHIPS payment clause in the CVAN-68 contract is due to the high unit price and length of the contract. The LHA contract also contained a unique modification to the standard payments clause. Payments during the first forty



months were to be based upon incurred costs. Payments after the forty months were to convert to a percentage-of-completion basis.

The NAVSHIPS payments clause was modified in the DLGN-36 contract to provide payments on an individual vessel basis as a result of a reduction in target price. This contract did not contain the revised billing base procedure. It was unique in that payments were initially based upon ceiling price rather than target price.

The area of greatest variability has been in the ceiling on total payments. The increased concern over progress payments is reflected in the use of a ceiling on total payments of 100% incurred costs during the first half of the DLGN-38 contract. Although the recommendations of the Task Group were not implemented until March of 1973, the impact is clearly visible in the payment ceiling of 95% of incurred costs used in the AOR-7 contract. The 688-II was the first major new construction contract signed after the change in payments policy implemented in SECNAVINST 7810.11. However, as noted in Chapter II the Navy was unsuccessful in implementing this policy. Payments in the 688-II contract were based upon physical progress with a payments ceiling of 95% of incurred costs as proposed by the Naval Ships Systems



Command. The use of the 95% ceiling required that the payments clause be written to exclude delivery payments from the ceiling on payments. Without the exemption of delivery payments, the ceiling would have prohibited the payment of profit until completion of the contract. This is the case in the AOR-7 contract, however, this contract involves the construction of only one ship.

In the TRIDENT submarine procurement, the low offeror would accept a fixed-priced contract only if the progress payments were based on percentage-of-completion. The increase in the payments ceiling to 100% of incurred costs resulted from the major investment in facilities required to perform the contract and the working capital implication of a 95% ceiling. An exception to the SECNAVINST 7810.11 was requested for the 688-III procurement. A ceiling of 100% of incurred costs was requested in order that the limitation on payments be identical to the TRIDENT contract. SECNAVINST 7810.11 was cancelled and progress based payments with a payment ceiling of 100% of incurred costs for the first half of the contract and 105% thereafter were authorized. Under the new policy the 105% cost ceiling on progress payments is contingent upon the contractor's ability to demonstrate the contract will result in a





profit of at least 5%. This provision is to reduce the risk of premature payment of profit. The 688-III contract provides payments in accordance with this new policy.

The analysis of the payments clauses shows that variations which provide a more favorable level of progress payments have predominantly been incorporated in contracts with Newport News. Additionally, the above comparison demonstrates that the impact of the changing payments policy can be traced through the various payment thresholds used in the individual contracts.

The most significant factor relevant to the impact of inflation on profit is that the payment provisions provide for the payment of little or no profit during the first half of the contract. The profit profiles generated by the procedure outlined in Chapter VI will demonstrate this. The actual payment thresholds in conjunction with the length of the contract are therefore significant factors in determining the impact of inflation on profit.



Table V

## Progress Payments

Contract.	688-III	TRIDENT	688-II	AOR-7	DLGN-38
Date/Contractor	8/75 (NN)	7/74 (EB)	10/73 (EB)	12/72 (NS)	12/71 (NN)
Based On					P00007
Total Contract Price (TCP)	AVP	TCP	TCP	TCP	TCP
Allocated Vessel Price (AVP)					
Billing Price Revision	Quarterly	Negotiated	Negotiated	Negotiated	Quarterly
% of Progress Limitation					
Total Progress <50%	90%	90%	90%	90%	90%
Total Progress ≥50%	100%	100%	100%	100%	100%
Withholding (Progress ≥50%)	5%	5%	5%	5%	5%
Performance Reserve	2%	2%	2%	2%	2%
Allocated Vessel Price			\$1.5million		
Reserve for Final Settlement	\$100,000	\$100,000	\$100,000	1% AVP \$100,000	\$100,000
Payments Limited by					
Total Incurred Costs					
Progress <50%	100%	100%	95%	95%	100%
Progress ≥50%	105%	100%	95%	95%	105%
Delivery Payments					
Exempt	Yes	Yes	Yes	NA	No
Frequency of Payment					
Semi-monthly	W	S	S	S	S
Weekly					



Table V

## Progress Payments

Contract Date/Contractor	688-I 1/71 (EB)	688-I 1/71 (NN)	688-LS 1/71 (NN) P00015	DD963 6/70 (L)	637-(2) 7/69 (NN)
Based On					
Total Contract Price (TCP)	TCP	TCP	TCP	TCP	TCP
Allocated Vessel Price (AVP)					
Billing Price Revision	Negotiated	Negotiated	Negotiated	Negotiated	Negotiated
% of Progress Limitation					
Total Progress <50%	90%	90%	90%	90%	90%
Total Progress ≥50%	100%	100%	100%	100%	100%
Withholding (Progress ≥50%)	5%	5%	5%	5%	5%
Performance Reserve	2%	2%	2%	2%	2%
Allocated Vessel Price	\$1.5million	\$1.5million	\$1.5million		
Reserve for Final Settlement	\$100,000	\$100,000	\$100,000	1% AVP \$100,000	1% AVP \$100,000
Payments Limited by					
Total Incurred Costs					
Progress <50%	105%	105%	105%	105%	105%
Progress ≥50%	105%	105%	105%	105%	105%
Delivery Payments	No	No	NA	No	No
Exempt					
Frequency of Payment					
Semi-monthly	S	S	S	S	S
Weekly					



Table V

## Progress Payments

Contract Date/Contractor	LHA 5/69 (L)	637-(4) 6/68 (EB)	DLGN-36 6/68 (NN)	CVAN-68 3/67 (NN)
Based On	(40 mo. Costs Incurred)			
Total Contract Price (TCP)	TCP			
Allocated Vessel Price (AVP)	AVP			
Billing Price Revision	Negotiated	Negotiated	Negotiated	Quarterly
% of Progress Limitation				
Total Progress < 50%	90%	90%	90%	95%
Total Progress ≥ 50%	100%	100%	100%	95%
Withholding (Progress ≥ 50%)	5%	5%	5%	-
Performance Reserve	2%	2%	2%	2% TCP/2
Allocated Vessel Price				
Reserve for Final Settlement	1% AVP \$100,000	1% AVP \$100,000	1% AVP \$100,000	\$100,000
Payments Limited by				
Total Incurred Costs				
Progress < 50%	105%	105%	105%	105%
Progress ≥ 50%	105%	105%	105%	105%
Delivery Payments				
Exempt	No	No	Yes	Yes
Frequency of Payment				
Semi-monthly	S	S	S	S
Weekly				





## V. PROFIT OBJECTIVES

Chapters III and IV have provided an analysis of the contract clauses that determine how and when the contractor is compensated. This chapter begins the analysis of going-in-profit on FPIF shipbuilding contracts. First, a brief overview will be given of defense profit policy. This will be followed by a comparison of the profit objectives contained in those fourteen contracts whose escalation and payments clauses have been subject to examination in previous chapters.

### A. PROFIT POLICY

Defense profit policy is applicable only to negotiated contracts. It does not apply when price competition exists, since in these instances the contract is awarded to the offerer with the lowest total price, all other factors being equal. In those procurements involving price competition, the government relies on market forces to determine the level of profit. In the absence of price competition, both of the elements of contract price, cost and profit, are determined through negotiation. ASPR section 3-808 contains a set of "weighted guidelines" which are to be



used by contracting officers in establishing a profit objective as part of their overall negotiating position. The level of profit is determined by applying the negotiated profit percentage to the negotiated elements of contract cost.

Section 3.808.1(a) of ASPR includes the following policy statement regarding profit:

It is the policy of the Department of Defense to utilize profit to stimulate efficient contract performance. Profit generally is the basic motive of business enterprise. The Government and defense contractors should be concerned with harnessing this motive to work for more effective and economical contract performance. Negotiation of very low profits, the use of historical averages, or the automatic application of a predetermined percentage to the total estimated cost of a product, does not provide the motivation to accomplish such performance. Furthermore, low average profit rates on defense contracts overall are detrimental to the public interest. Effective national defense in a free enterprise economy requires that the best industrial capabilities be attracted to defense contracts. These capabilities will be driven away from the defense market if defense contracts are characterized by low profit opportunities. Consequently, negotiations aimed merely at reducing prices by reducing profits, with no realization of the function of profit cannot be condoned.

However, the importance placed on the profit motive on an individual contract basis appears to be in conflict with the role expressed for profit in ASPR 3-806 regarding cost, profit and price relationships:



...government procurement is concerned primarily with the reasonableness of the price which the government ultimately pays and only secondarily with the eventual cost and profit to the contractor.

There has been much criticism of the use of the "weighted guidelines" in the negotiation of profit. An often stated criticism is that the "weighted guidelines" give little consideration to the amount of capital investment required from the contractor. Both the GAO and LMI in studies of profits in the defense industry have concluded that inequities in return on investment have resulted among contractors providing differing proportions of capital required for contract performance.

A fundamental issue in the controversy over the use of "weighted guidelines" is whether a method of determining profit as a percentage of cost is an adequate concept of profit. Within the private sector, company management is responsible for generating a return on investment which is satisfactory to both stockholders and lenders. They, therefore, relate profit to capital investment. The relationship between profit and capital investment can be expressed as follows:

$$\frac{\text{Profit}}{\text{Capital Investment}} = \frac{\text{Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Capital Investment}}$$



The ratio of profit/sales is called the profit margin while the sales/capital investment ratio is the capital turnover. The above formula, frequently called the return on investment formula, illustrates that profit/capital investment is dependent upon both the profit margin and the capital turnover.

When profit is determined as a percentage of cost and does not reflect investment, the contractor can increase profit on capital investment in one of two ways: first by increasing sales volume, and second by minimizing investment. The GAO report on profits concluded that by relating profits to costs there is little incentive to invest in equipment which would increase efficiency and reduce costs.

The current "Profit 76" study reflects the concern of the Department of Defense for the impact of profit policy on contractor investment. One of the stated objectives of the study is to assess the opportunities for cost reduction investment and examine the relation of earnings to such investment.

There have been others within the defense establishment that have based their criticism on other factors. For example Gordon Rule, Director of the Procurement Contract and Clearance Division within NAVMAT in a letter to J. Ronald Fox, Assistant Secretary of the Army (I&L), states:

(17)





I would like to make a suggestion re defense profits generally. It is my opinion that we need a better method of profit determination than presently provided by the weighted guidelines method in ASPR 3-808. All too often do we, in reviewing negotiated contractual arrangements, find that the negotiators are agreeing on an overall price and then "backing into" some figures to put on the form. As practiced, it can be very phony.

Moreover, I do not feel the basic concept of the WGL is practical in that we are not smart or wise enough to intelligently recognize and properly evaluate risks which is the basic touchstone of the WGL theory.

On 11 December 1972 the Department of Defense in Defense Procurement Circular 107 established a revised method for determining prenegotiation profit objectives by specifically recognizing contractor capital employed in contract performance. Under DPC 107, 50% of the prenegotiation profit objective is determined by using the "weighted guidelines" and 50% is determined by return on investment on allocated capital. This revised method was authorized on a trial basis and, therefore, may be applied only by mutual agreement. However, the price thresholds of contracts to which this policy may be applied precludes its application to major shipbuilding contracts. Its application in other areas has been minimal.



## B. COST INCENTIVES

The predominate contract type used by the Navy in the acquisition of ships is the fixed-price incentive fee. In an incentive contract there are three types of incentive parameters which may be used: cost, schedule, and performance. The straight cost incentive has received the widest application within shipbuilding and will be the only type discussed in this chapter. The cost incentive is specified in the Incentive Price Revision Clause. It is simply an arrangement whereby the contractor's profit increases or decreases as his actual base costs fall below or above the contract target cost. The use of cost incentives is an attempt to incentivize cost control by the contractor, while reducing the contractor's risk due to the uncertainty of estimated cost.

The essential characteristics of a fixed-price incentive fee contract are: target cost, target profit, ceiling price and the sharing ratio. The DOD/NASA Incentive Contracting Guide states that "...target cost should present an equal probability of cost over target or under target." (18). The ceiling price is the maximum amount for which the government will be liable. The sharing ratio, frequently referred to as the share line, is the government-to-contractor cost



sharing arrangement by which any difference between the estimated and actual cost is absorbed. The cost incentive may consist of a single or multiple sharing ratio. A specific cost range is designated for each sharing ratio used.

Figure 2 is an example of a cost/profit diagram for a hypothetical fixed price incentive fee contract. The 70/30 sharing ratio below the target cost results in an additional \$.30 of profit for each dollar that the actual base cost is below the target cost. The 80/20 sharing ratio results in a reduction of \$.20 in profit for each dollar that final base cost exceeds target cost. The intersection of the 0/100 share line originating from the ceiling price and the 80/20 share line is called the Point of Total Assumption (PTA). It is at the point of total assumption that cost sharing ceases and the contractor absorbs all additional cost growth. The PTA, therefore, determines the range of cost sharing above target cost.

The following formula may be used to calculate the point of total assumption for cost sharing arrangements involving a single sharing ratio above target cost:

$$\text{PTA} = \frac{\text{Ceiling Price} - \text{Target Price}}{\text{Government Share}} + \text{Target Cost}$$



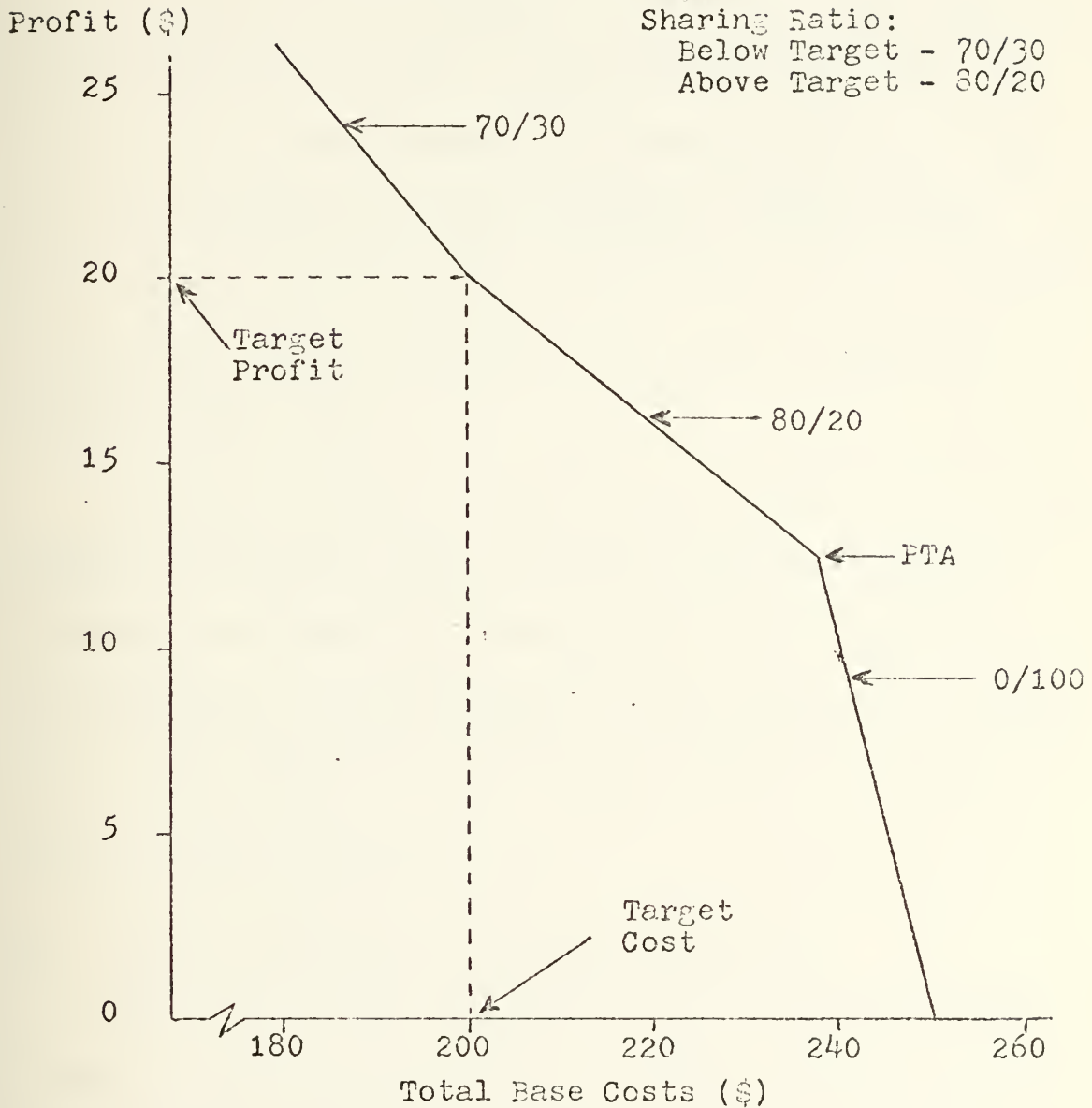
### Example Cost/Profit Diagram

Target Cost = \$200  
Target Profit = \$20  
Ceiling Price = \$250

Sharing Ratio:

Below Target - 70/30

Above Target - 80/20



$$PTA = \frac{\$250 - \$220}{.8} + \$200 = \$237.50$$

Figure 2





The calculation of PTA cost for sharing arrangements involving multiple sharing ratios is discussed in the DOD/NASA Incentive Contracting Guide.

The cost at PTA in Figure 2 is \$237.50. The range of cost sharing above target is from \$200 to \$237.50. The example cost/profit diagram illustrates graphically that the PTA depends upon three parameters: Target Profit, Ceiling Price and the cost sharing above target. A change in any one of these three parameters will result in a different PTA cost.

The above discussion demonstrates that the analysis of profit in incentive type contracts would be incomplete without consideration of the cost sharing arrangement. The remainder of this chapter will be devoted to a comparison of the profit and cost sharing incentives contained in shipbuilding contracts.

#### C. PROFIT OBJECTIVES FOR SELECTED CONTRACTS

Table VI provides a listing of the percentage profit rates and sharing ratios for the fourteen sample contracts. The ceiling price and PTA are both expressed as a percentage of target cost so that a comparison can be made of the cost sharing range.



Any conclusion derived from the contents of Table VI must take into consideration that each cost sharing arrangement reflects the particular procurement and individual contractor. This difficulty can basically be overcome by concentrating on contracts involving similar ship types.

1. 637 Class Submarine Procurements

The last two procurements of the 637 class submarine provide a perspective from which to view the 688 class submarine procurements. The appropriate data from Table VI for these two contracts is listed below.

	637-(2)	637-(4)
Contract/Date	7/69	6/68
Sharing Ratio Below Target	70/30	70/30
Above Target	70/30	70/30
Ceiling as % Target Cost	121.0	128.9
PTA as % of Target Cost	115.7	125.0
% Profit @ Target Cost	10.00	11.35

The 637-(2) contract was awarded to Newport News on the basis of price competition and without consultation with the respective offerers. This may account for the lower profit percentage and small cost sharing range relative to the 637-(4) contract with Electric Boat. Both contractors had substantial experience in the construction of this class vessel.



## 2. 688 Class Submarine Procurements

The appropriate data from Table VI for the four follow-on contracts is listed below.

Contract/Date	688-III 8/75 NN	688-II 10/73 EB	688-I 1/71 EB	688-I 1/71 NN
Sharing Ratio				
Below Target	70/30	70/30	70/30	70/30
Target to	1.11 TC	1.0256 TC	Ceiling	Ceiling
	95/5	85/15	70/30	70/30
To Ceiling	To Ceiling	To Ceiling		
	85/15	70/30		
Ceiling as %				
Target Cost	133.2	123.1	116.0	110.8
PTA as % of				
Target Cost	122.4	115.4	105.9	101.2
% Profit @				
Target Cost	13.0	11.9	11.9	10.0

The procurement of the first flight of 688 class submarines was split between Newport News and Electric Boat. Although these contracts were for a new class of submarine, the range of cost sharing is significantly smaller than on the 637-(4) and 637-(2) contracts. The second and third flight procurements, however, are characterized by the use of multiple sharing ratios which increase from 85/15 and 70/30 in the 688-II contract to 95/5 and 85/15 in the 688-III contract. In addition to the increased government cost share, the range of cost sharing is progressively larger.



### 3. DLGN 36 & 38 Procurements

The appropriate data from Table VI for the two DLGN contracts is listed below.

Contract/Date	DLGN-38 12/71	DLGN-36 6/68
Sharing Ratio Below Target	80/20	75/25
Target to	Ceiling 80/20	1.1575 TC 90/10 To Ceiling 75/25
Ceiling as % Target Cost	132.7	137.8
PTA as % of Target Cost	125.0	129.9
% Profit @ Target Cost	12.74	13.0

The cost sharing incentives in the DLGN-36 and DLGN-38 contracts reflect the opposite use of multiple incentives than in the 688 procurements. Although these vessels are not of the same class they are very similar and represent successive construction. The multiple sharing incentive in the DLGN-36 contract provides for a larger government cost share and a greater sharing range than on the DLGN-38 contract.

It is assumed that the sharing ratio and the range of sharing reflect the relative cost uncertainty associated with FPIF contracts. The increasing cost uncertainty reflected by the cost sharing incentives in the 688-II and





and 688-III contracts is opposite to what intuitively would be expected in follow-on contracts. At least this is counter to what was found to be the case in the two 637 class submarine procurements and the two DLGN procurements. One explanation is that the increased uncertainty in cost is due in part to a higher rate of inflation and concern regarding escalation coverage on the part of the contractor. The cost sharing incentives in the 688-II and the 688-III contracts could represent attempts to isolate from contractor cost performance the potential impact of inflation not covered by escalation. This practice was noted in Chapter III section B. The use of cost sharing ratios in the TRIDENT contract that are identical to those in 688-III support this possible explanation.

A comparison of the profit percentages on those contracts with only Newport News and Electric Boat does not reveal a discernible pattern. The 688 contracts may indicate an increase in profit rates, but this observation rests primarily on the rate in the 688-III contract which is 13.0%.

Figures 3-14 are the cost/profit diagrams for all but the LHA and DD963 contracts. A theory advanced by a procurement contracting officer is that contractors are more



concerned with profit at PTA than at target cost. According to this theory contractors negotiate terms which will provide a minimum acceptable level of profit at PTA. Profit at PTA would, therefore, represent a lower bound on profit. Profit at PTA which is greater than the minimum acceptable level would reflect the relative success of the contractor in the negotiation process. This theory represents a simple view of corporate motivation and is not based upon the traditional profit maximization motive. As a check on the validity of this theory the profit per vessel at PTA was compared in those contracts involving multiple procurements.

The 688 procurements support the validity of this theory. Figures 4 and 5 illustrate that the profit per vessel at PTA in the 688 first flight contracts is almost identical even though the profit percentage and sharing range are different. Furthermore the same measure for the contracts in the first two flights exhibits little variation. The profit per vessel at PTA in the 688-III contract, however, is almost double that of the preceding four contracts. As is evident from Figure 7 this increase is due to the increased government cost share in the cost sharing incentive.

Likewise, the profit per vessel at PTA in the DLGN contracts, Figures 8 and 9, are similar. Although this



neither proves or disproves the theory it does strengthen its credibility.

The analysis of profit objectives thus far has not addressed the question of when the profit is to be received. The next chapter will introduce the parameter of time into the analysis.



Table VI

Contract Date/Contractor	Profit Objective				
	688-III 8/75 (NN)	TRIDENT 7/74 (EB)	688-II 10/73 (EB)	AOR-7 12/72 (NS)	DLGN-38 12/71 (NN) P00007
Sharing Ratio Below Target	70/30	70/30	70/30	75/25	80/20
Target to	1.11 TC 95/5 To Ceiling 85/15	1.0811 TC 95/5 To Ceiling 85/15	1.0256 TC 85/15 To Ceiling 70/30	Ceiling 75/25	Ceiling 80/20
∞ Ceiling as % Target Cost	133.1674	147.6077	123.0695	125.0000	132.7434
PTA as % of Target Cost	122.43	140.00	115.41	121.03	125.00
% Profit @ Target Cost	13.00	12.81	11.90	9.23	12.74
Length of Contract in Months (Date of Contract to Delivery Date of last Vessel)	79	76	87	36	69





Table VI

Contract Date/Contractor	Profit Objective			
	688-I 1/71 (EB)	688-I 1/71 (NN)	688-IS 1/71 (NN)	DD963 6/70 (L)
Sharing Ratio				637-(2) 7/69 (NN)
Below Target	70/30	80/20	80/20	(85/15) 50/50*
Above Target	70/30	70/30	70/30	70/30
Ceiling as % Target Cost	116.0000	110.8242	124.8120	(130.00) 109.7175*
PTA as % of Target Cost	105.86	101.18	118.26	115.71
% Profit @ Target Cost	11.90	10.00	12.03	(8.70) 5.51*
Length of Contract in Months (Date of Contract to Delivery Date of last Vessel)	78	66	45	56

\*Reset



Table VI

## Profit Objective

Contract Date/Contractor	LHA 5/69 (L)	637-(4) 6/68 (EB)	DLGN-36 6/68 (NN)	CVAN-68 3/67 (NN)
Sharing Ratio Below Target	80/20	70/30	75/25	85/15
Target to	Ceiling 80/20	Ceiling 70/30	1.1575 TC 90/10	1.05 TC 95/5
			To Ceiling 75/25	1.15 TC 90/10
				To Ceiling 85/15
Ceiling as % Target Cost	(130.00) 104.1059*	128.8604	137.7953	133.3333
PTA as % of Target Cost	100.00*	125.01	129.92	123.92
% Profit @ Target Cost	(9.76) 4.11*	11.35	13.00	12.00
Length of Contract in Months (Date of Contract to Delivery Date of last Vessel)	80*	57	59	Contingent on delivery of first vessel

\*Reset (Contracting Officer's Decision)



Contract N00024-70-C-0269  
 # Vessels/Class 1/SSN 688  
 Target Cost \$66,500,000  
 Target Profit 8,000,000  
 Ceiling Price 83,000,000  
 PTA 78,642,857  
 Profit @ PTA 4,357,143  
 % Profit @ Target Cost 12.03  
 PTA as % of Target Cost 118.26

Figure 3  
 Cost/Profit Diagram  
 688 - LS Contract

10

Profit (\$ Millions)

Sharing Ratio:  
 Below Target - 80/20  
 Above Target - 70/30

5

Newport News Shipbuilding and Dry Dock Company

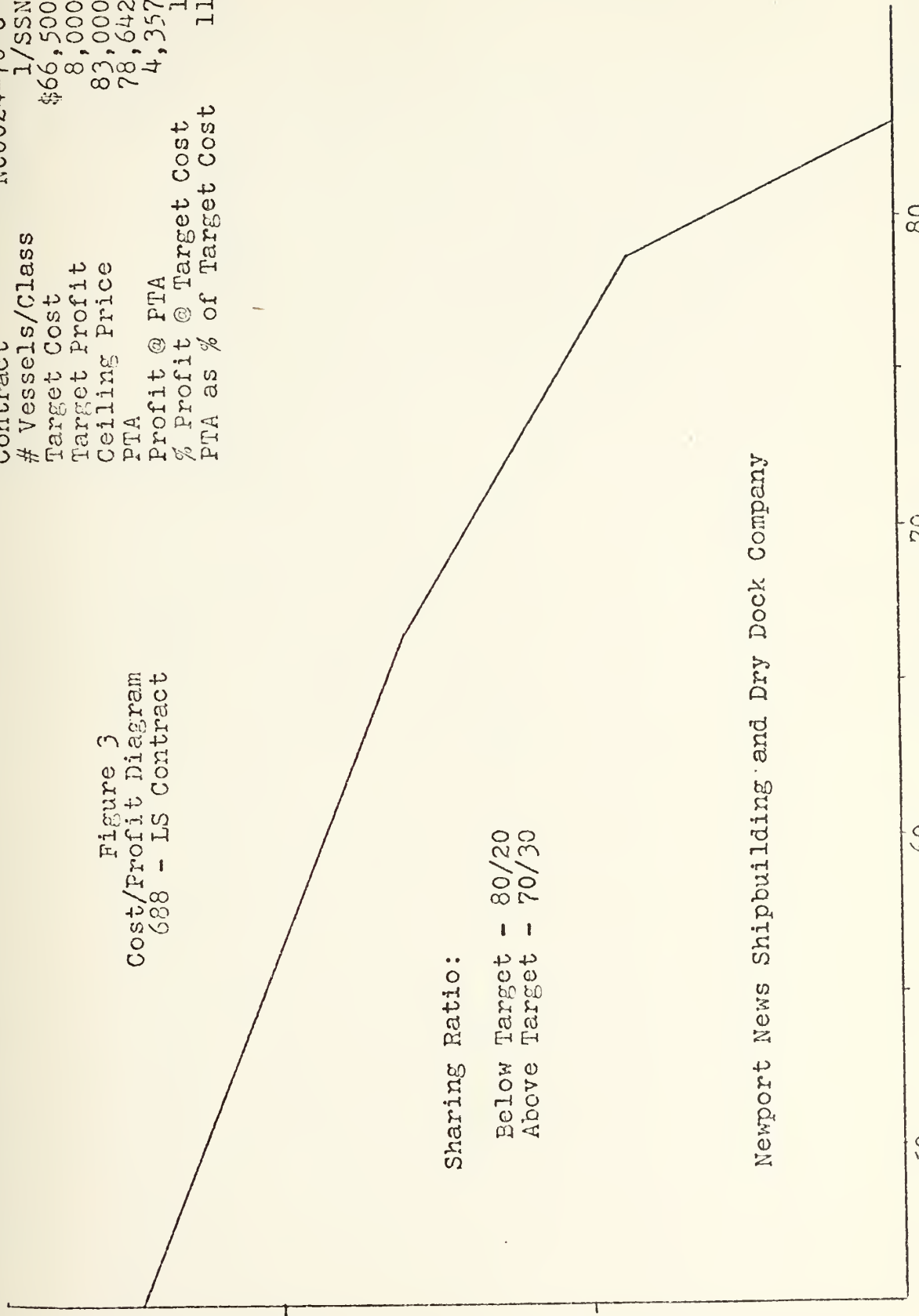
50

60

70

Cost (\$ Millions)

80





Contract N00024-71-C-0270  
 # Vessels/Class 4/SSN 688  
 Target Cost \$225,131,292  
 Target Profit 22,513,129  
 Ceiling Price 249,500,000  
 PTA 227,782,119  
 Profit @ PTA 21,717,881  
 Profit @ PTA/Vessel 5,429,470  
 % Profit @ Target Cost 10.00  
 PTA as % of Target Cost 101.18

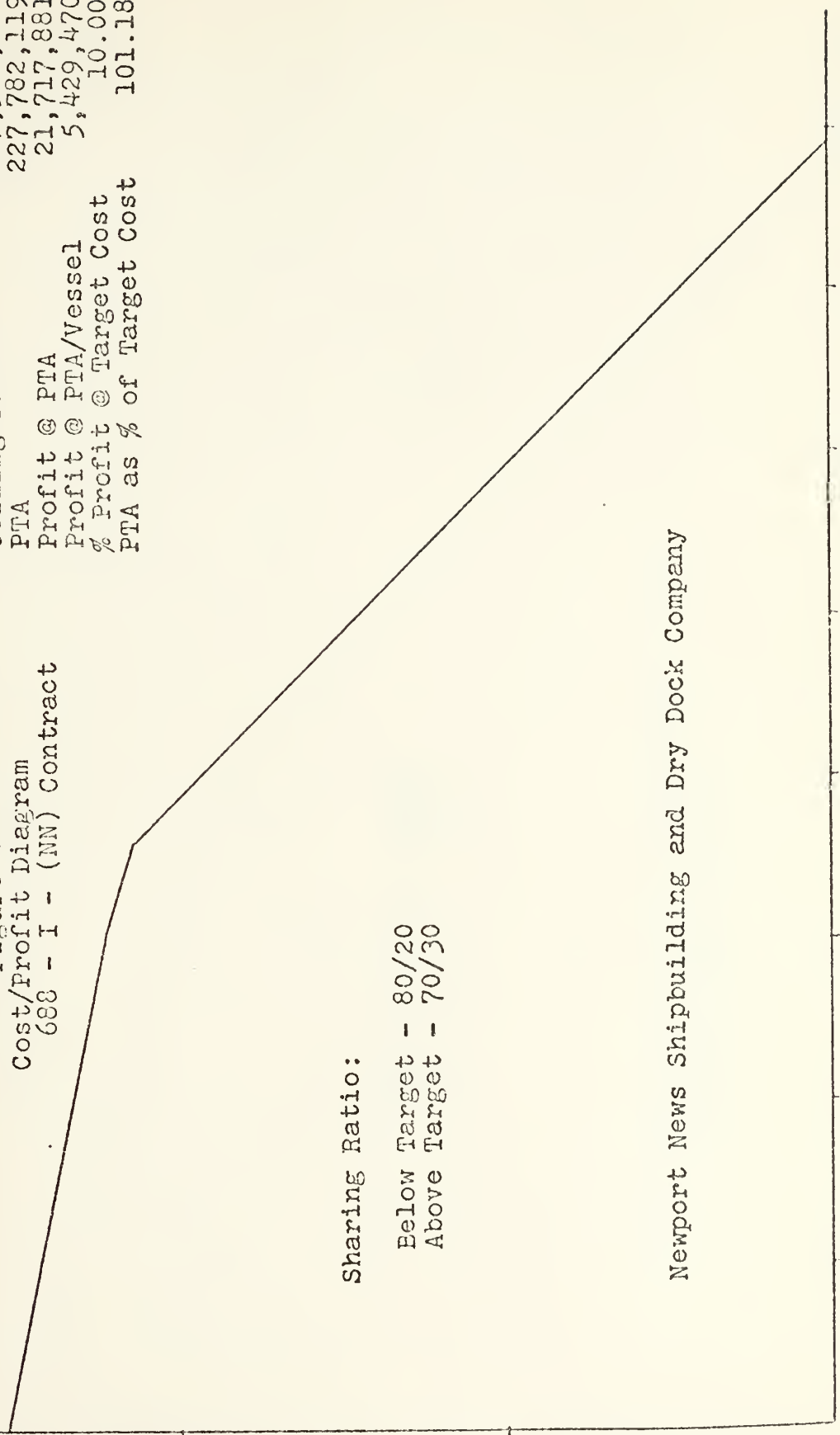
Figure 4  
 Cost/Profit Diagram  
 688 - I - (NN) Contract

96  
 Profit (\$ Millions)

Sharing Ratio:  
 Below Target - 80/20  
 Above Target - 70/30

Newport News Shipbuilding and Dry Dock Company

220 230 240 250  
 Cost (\$ Millions)







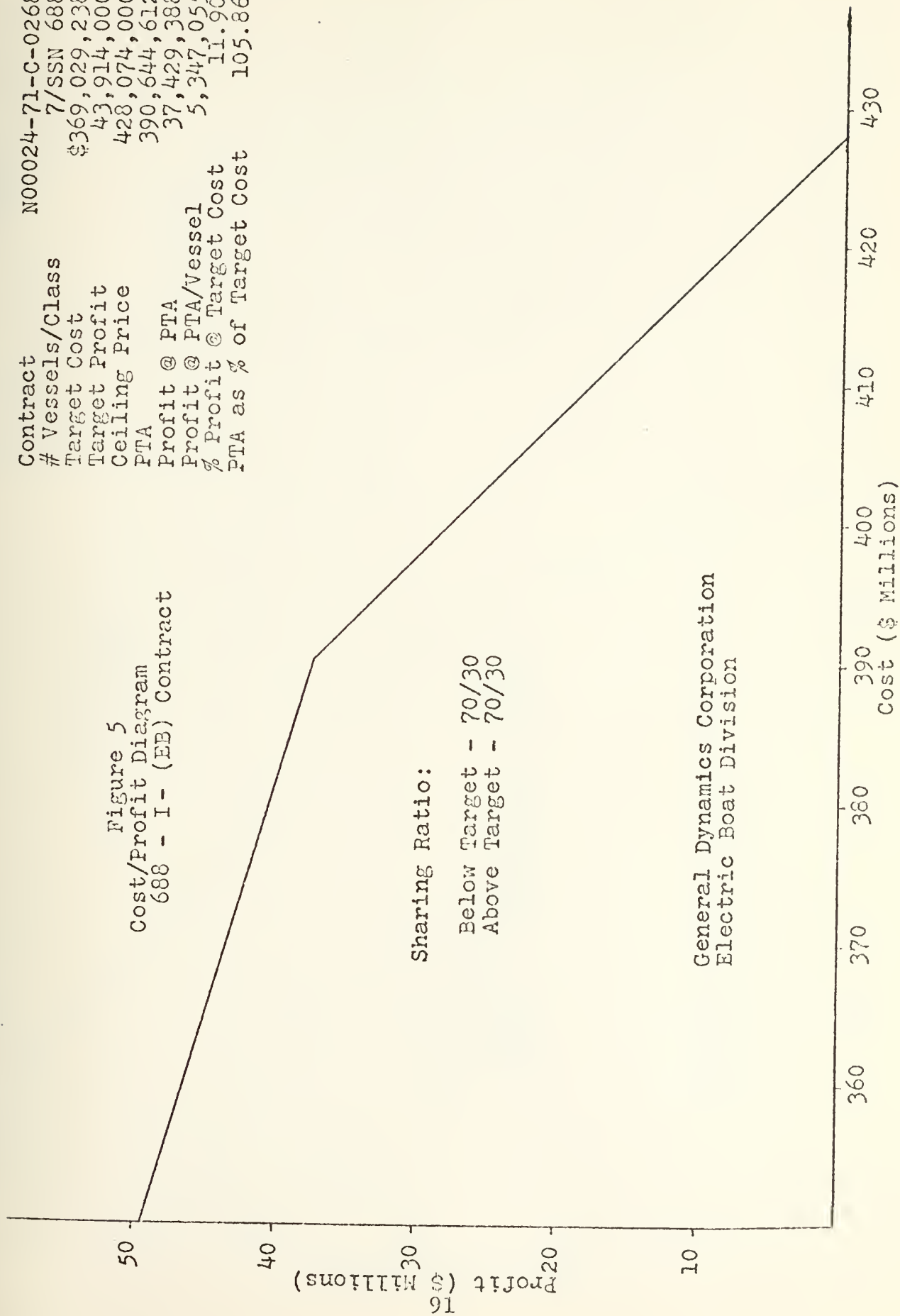
Contract N00024-71-C-0268  
 # Vessels/Class 7/SSN 688  
 Target Cost \$369,029,238  
 Target Profit 43,914,000  
 Ceiling Price 428,074,000  
 PTA 390,644,612  
 Profit @ PTA 37,429,388  
 Profit @ PTA/Vessel 5,347,055  
 % Profit @ Target Cost 11.90  
 PTA as % of Target Cost 105.86

Figure 5  
 Cost/Profit Diagram  
 688 - I - (EB) Contract

Sharing Ratio:

Below Target - 70/30  
 Above Target - 70/30

General Dynamics Corporation  
 Electric Boat Division





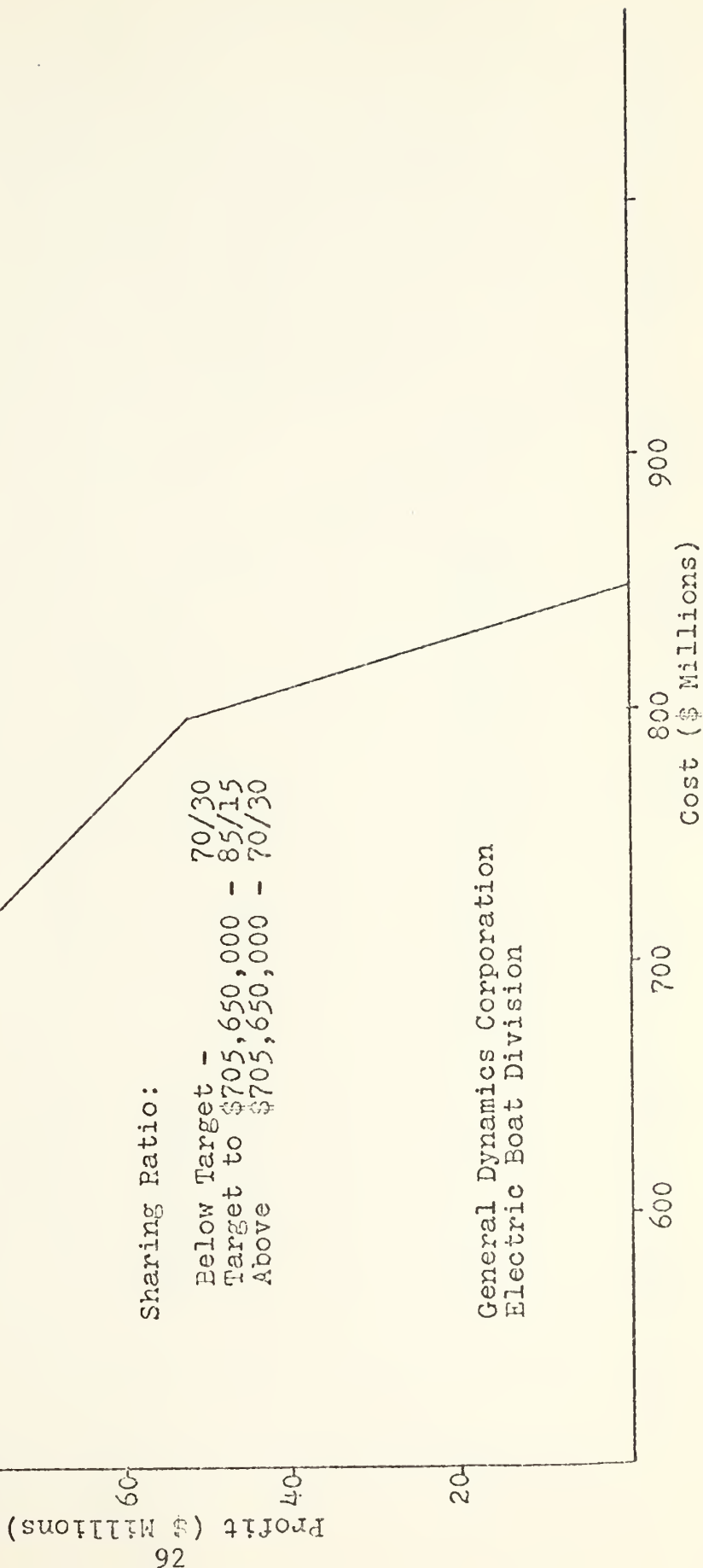
Contract N00024-74-C-0206  
 # Vessels/Class 11/SSN 688  
 Target Cost \$688,050,000  
 Target Profit 81,873,000  
 Ceiling Price 846,780,000  
 PTA 794,074,286  
 Profit @ PTA 52,705,714  
 Profit @ PTA/Vessel 4,791,429  
 % Profit @ Target Cost 11.90  
 PTA as % of Target Cost 115.41

Figure 6  
 Cost/Profit Diagram  
 688 - II Contract

Sharing Ratio:

Below Target - 70/30  
 Target to \$705,650,000 - 85/15  
 Above \$705,650,000 - 70/30

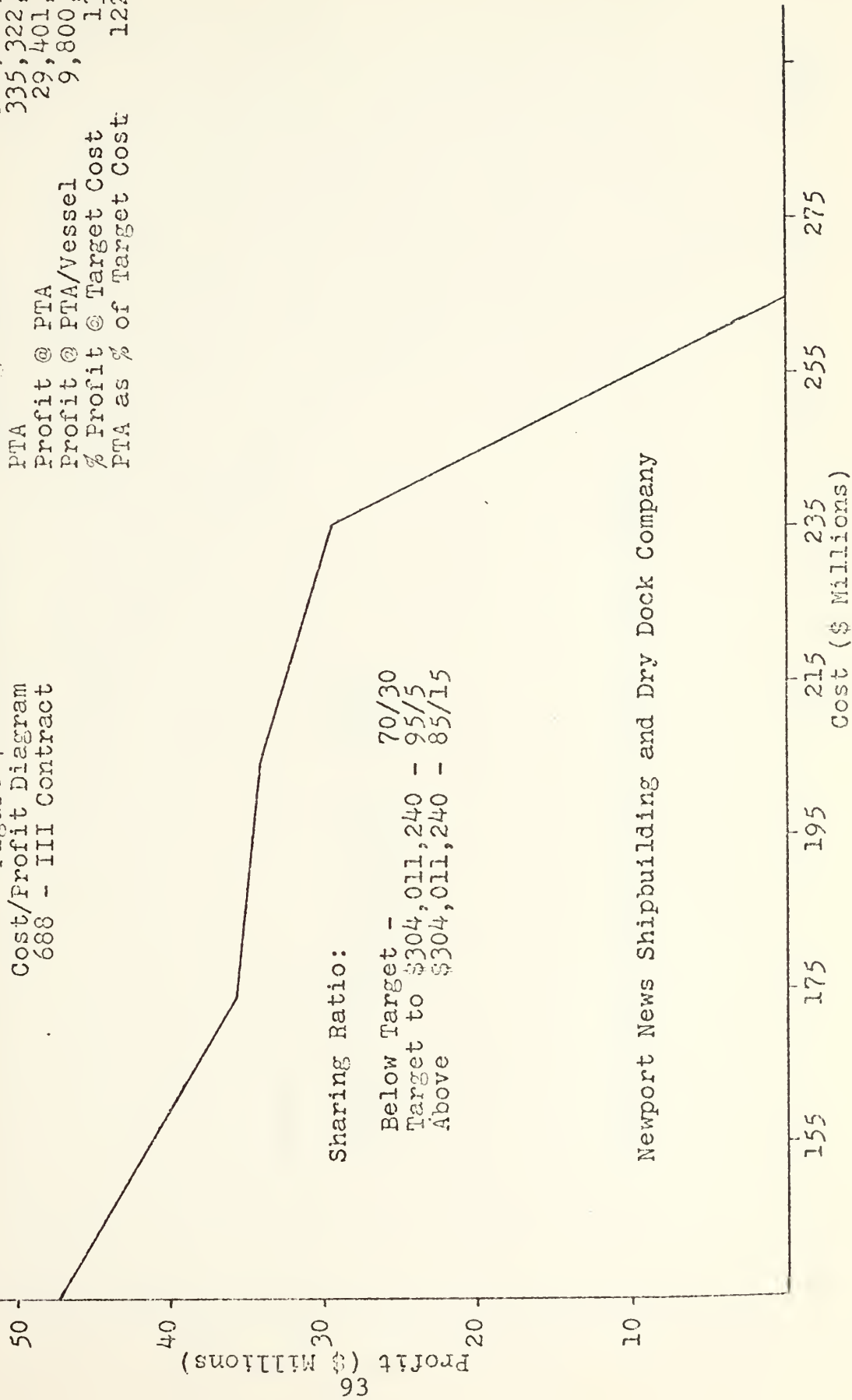
General Dynamics Corporation  
 Electric Boat Division





Contract N00024-76-C-2031  
 # Vessels/Class 3/SSN 688  
 Target Cost \$273,884,000  
 Target Profit 35,604,920  
 Ceiling Price 364,724,300  
 PTA 335,322,419  
 Profit @ PTA 29,401,881  
 Profit @ PTA/Vessel 9,800,627  
 % Profit @ Target Cost 13.00  
 PTA as % of Target Cost 122.43

Figure 7  
 Cost/Profit Diagram  
 688 - III Contract





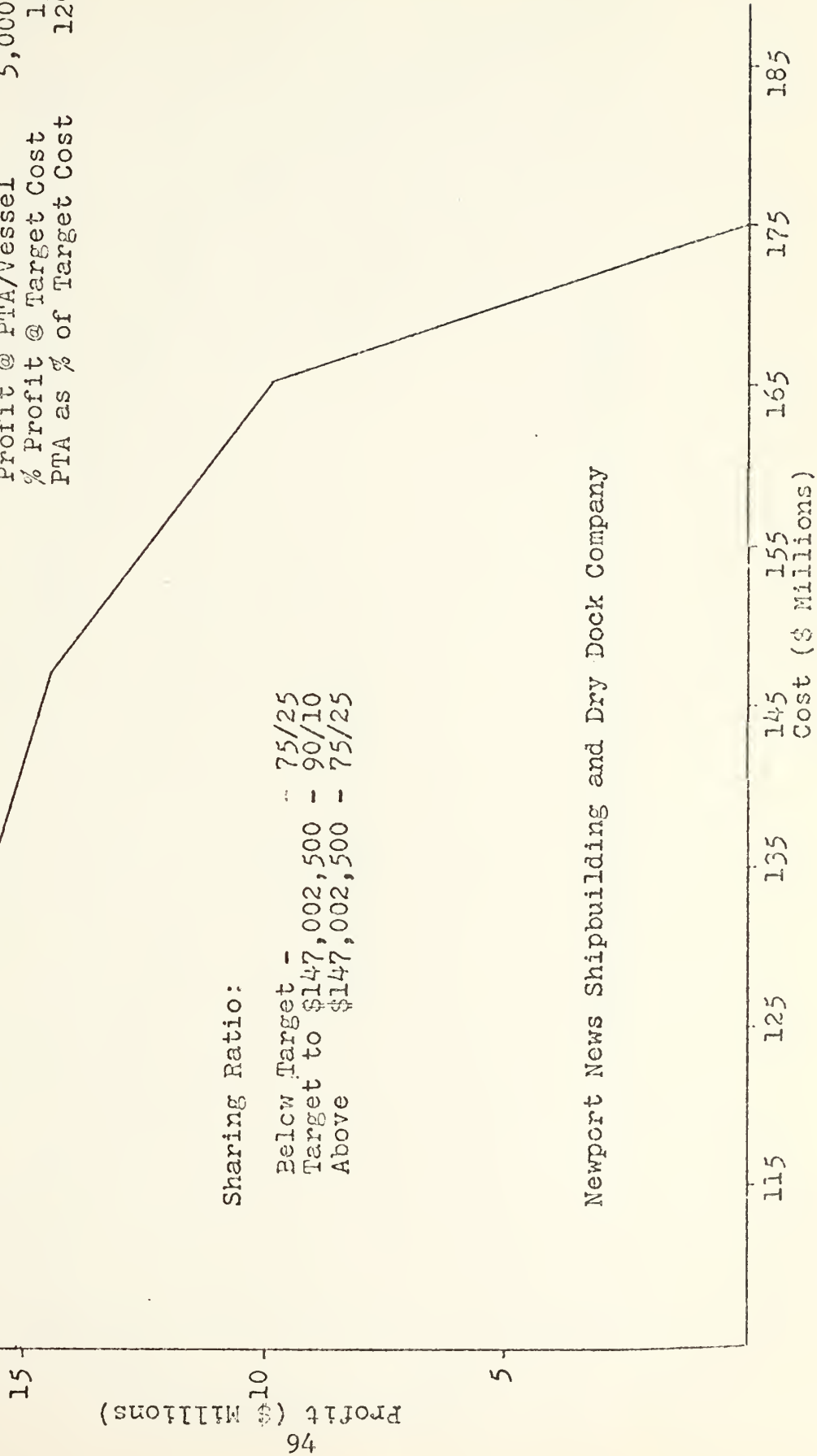
Contract N00024-68-C-0355  
 # Vessels/Class 2/DLGN 36  
 Target Cost \$127,000,000  
 Target Profit 16,500,000  
 Ceiling Price 175,000,000  
 PTA 164,999,500  
 Profit @ PTA 10,000,500  
 Profit @ PTA/Vessel 5,000,250  
 % Profit @ Target Cost 13.00  
 PTA as % of Target Cost 129.92

Figure 8  
 Cost/Profit Diagram  
 DLGN - 36

Sharing Ratio:

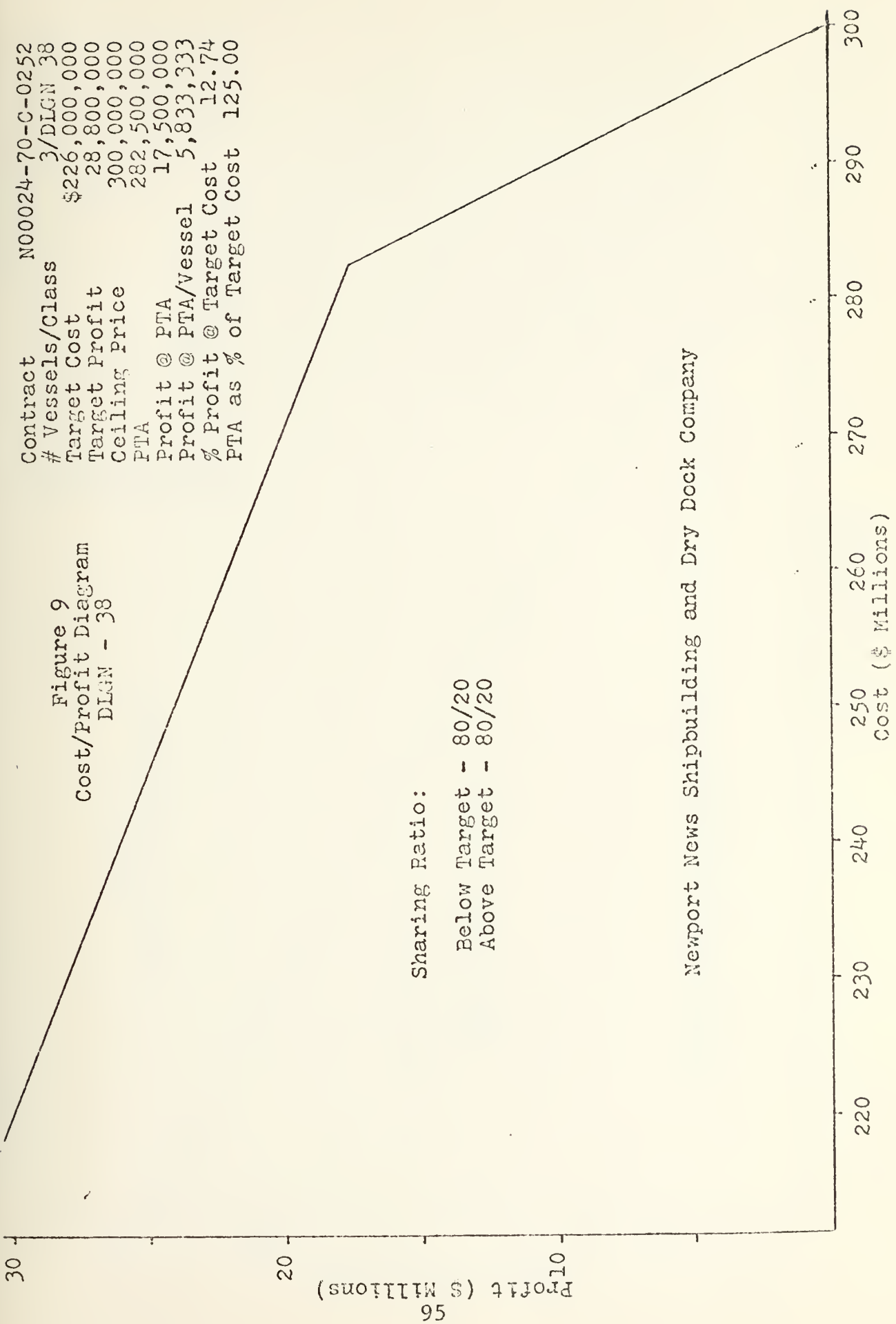
Below Target - 75/25  
 Target to \$147,002,500 - 90/10  
 Above \$147,002,500 - 75/25

Newport News Shipbuilding and Dry Dock Company









Contract N00024-70-C-0252  
 # Vessels/Class 3/DIGN 38  
 Target Cost \$226,000,000  
 Target Profit 28,800,000  
 Ceiling Price 300,000,000  
 PTA 282,500,000  
 Profit @ PTA 17,500,000  
 Profit @ PTA/Vessel 5,833,333  
 % Profit @ Target Cost 12.74  
 PTA as % of Target Cost 125.00

Figure 9  
 Cost/Profit Diagram  
 DIGN - 38

Sharing Ratio:  
 Below Target - 80/20  
 Above Target - 80/20

Newport News Shipbuilding and Dry Dock Company



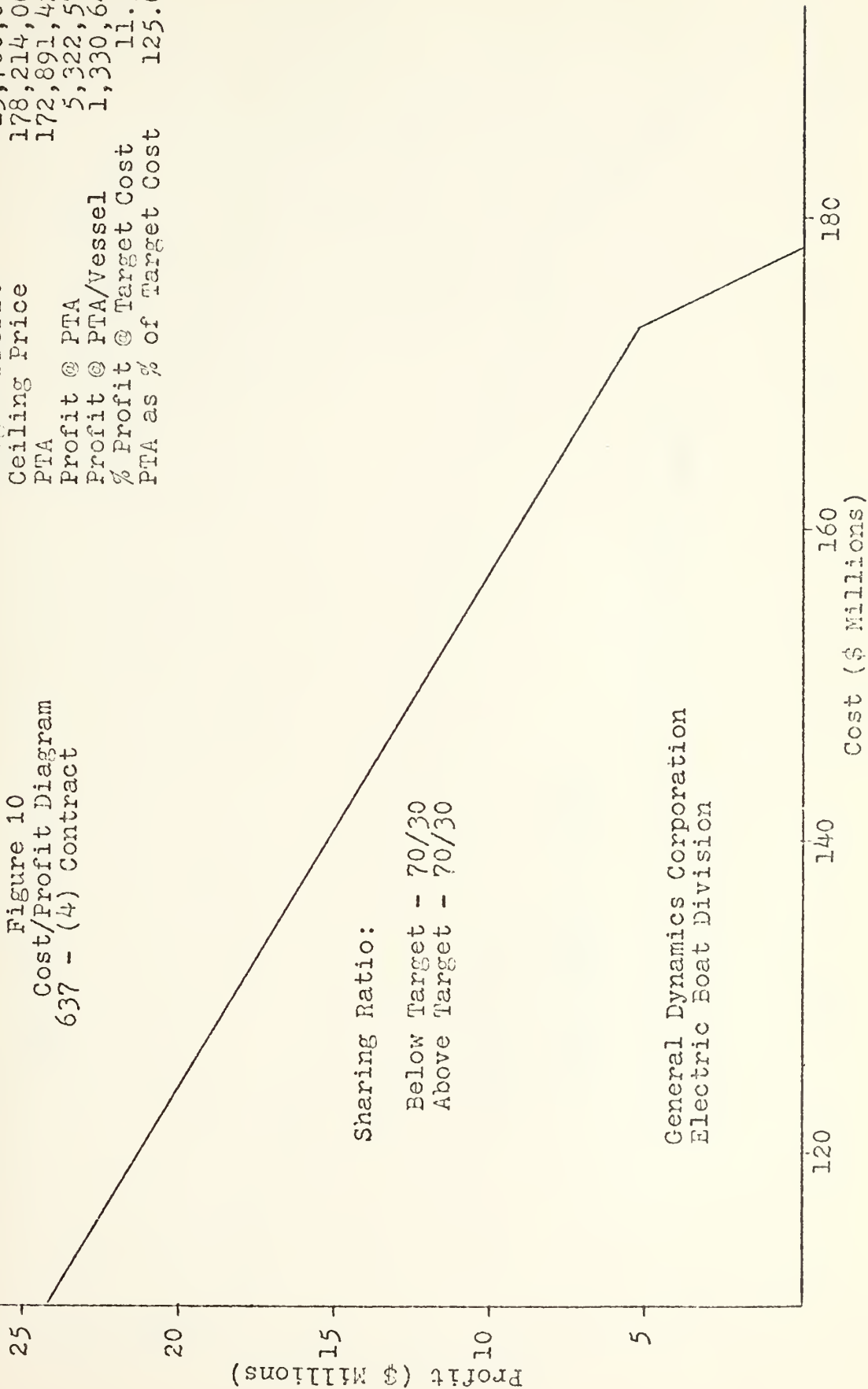
Contract N00024--68-C-0343  
 # Vessels/Class 4/SSN 637  
 Target Cost \$138,300,000  
 Target Profit 15,700,000  
 Ceiling Price 178,214,000  
 PTA 172,891,429  
 Profit @ PTA 5,322,571  
 Profit @ PTA/Vessel 1,330,643  
 % Profit @ Target Cost 11.35  
 PTA as % of Target Cost 125.01

Figure 10  
 Cost/Profit Diagram  
 637 - (4) Contract

Sharing Ratio:

Below Target - 70/30  
 Above Target - 70/30

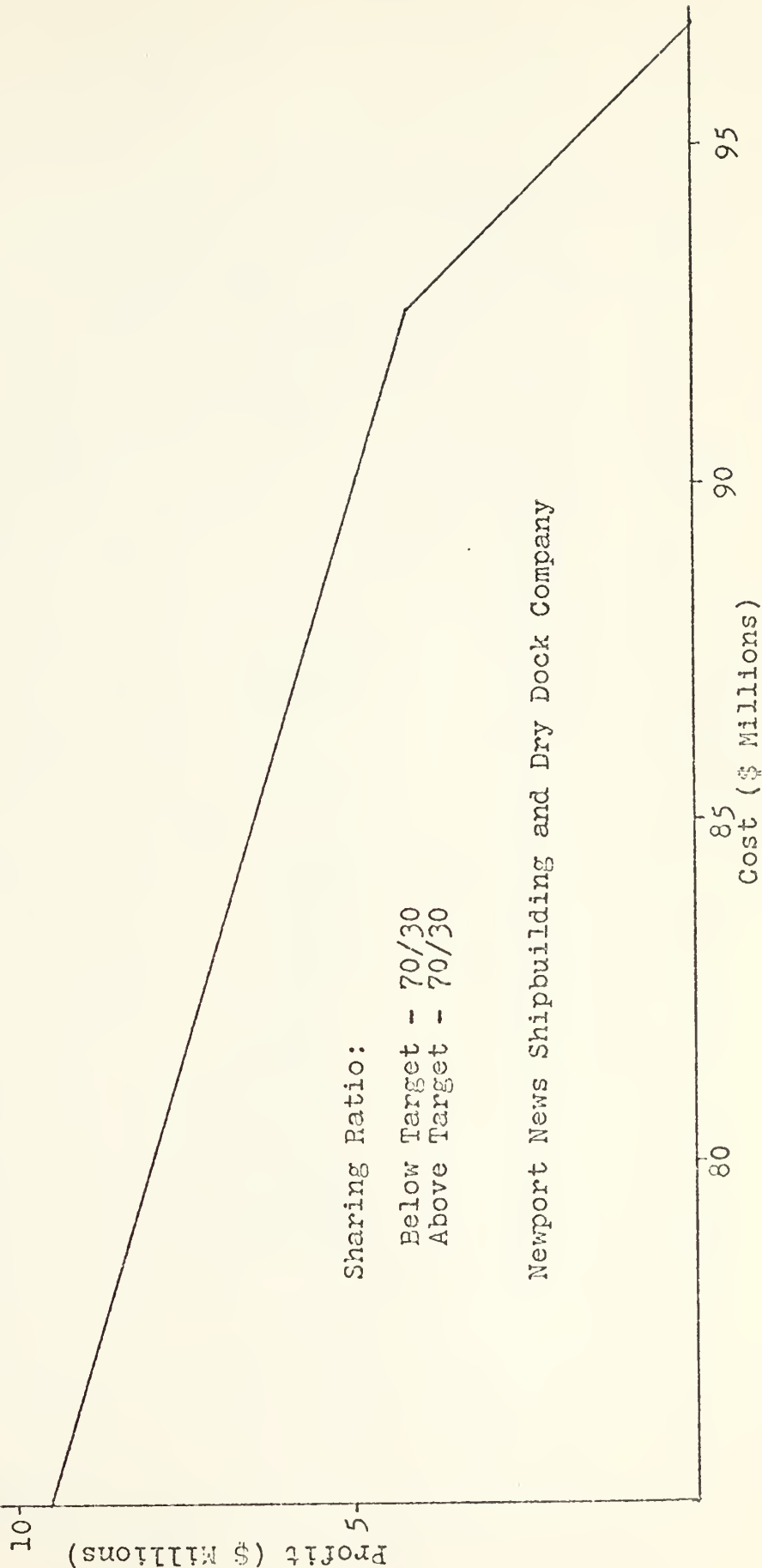
General Dynamics Corporation  
 Electric Boat Division





Contract N00024-69-C-0307  
 # Vessels/Class 2/SSN 637  
 Target Cost \$80,000,000  
 Target Profit 8,000,000  
 Ceiling Price 96,800,000  
 PTA 92,571,429  
 Profit @ PTA 4,228,571  
 Profit @ PTA/Vessel 2,114,286  
 % Profit @ Target Cost 10.00  
 PTA as % of Target Cost 115.71

Figure 11  
 Cost/Profit Diagram  
 637 - (2) Contract



Sharing Ratio:

Below Target - 70/30  
 Above Target - 70/30

Newport News Shipbuilding and Dry Dock Company



Contract N00024-67-C-0325  
 # Vessels/Class 2/CVAN 68  
 Target Cost \$570,000,000  
 Target Profit 68,400,000  
 Ceiling Price 760,000,000  
 PTA 706,352,941  
 Profit @ PTA 53,647,059  
 Profit @ PTA/Vessel 26,823,530  
 % Profit @ Target Cost 12.00  
 PTA as % of Target Cost 123.92

Figure 12  
 Cost/Profit Diagram  
 CVAN - 68 Contract

Profit (\$ Millions)

Sharing Ratio:

Below Target - 85/15  
 Target to \$598,500,000 - 95/5  
 \$598,500,000 to \$655,500,000 - 90/10  
 Above \$655,500,000 - 85/15

Newport News Shipbuilding and Dry Dock Company

590 630 670 710 750  
 Cost (\$ Millions)





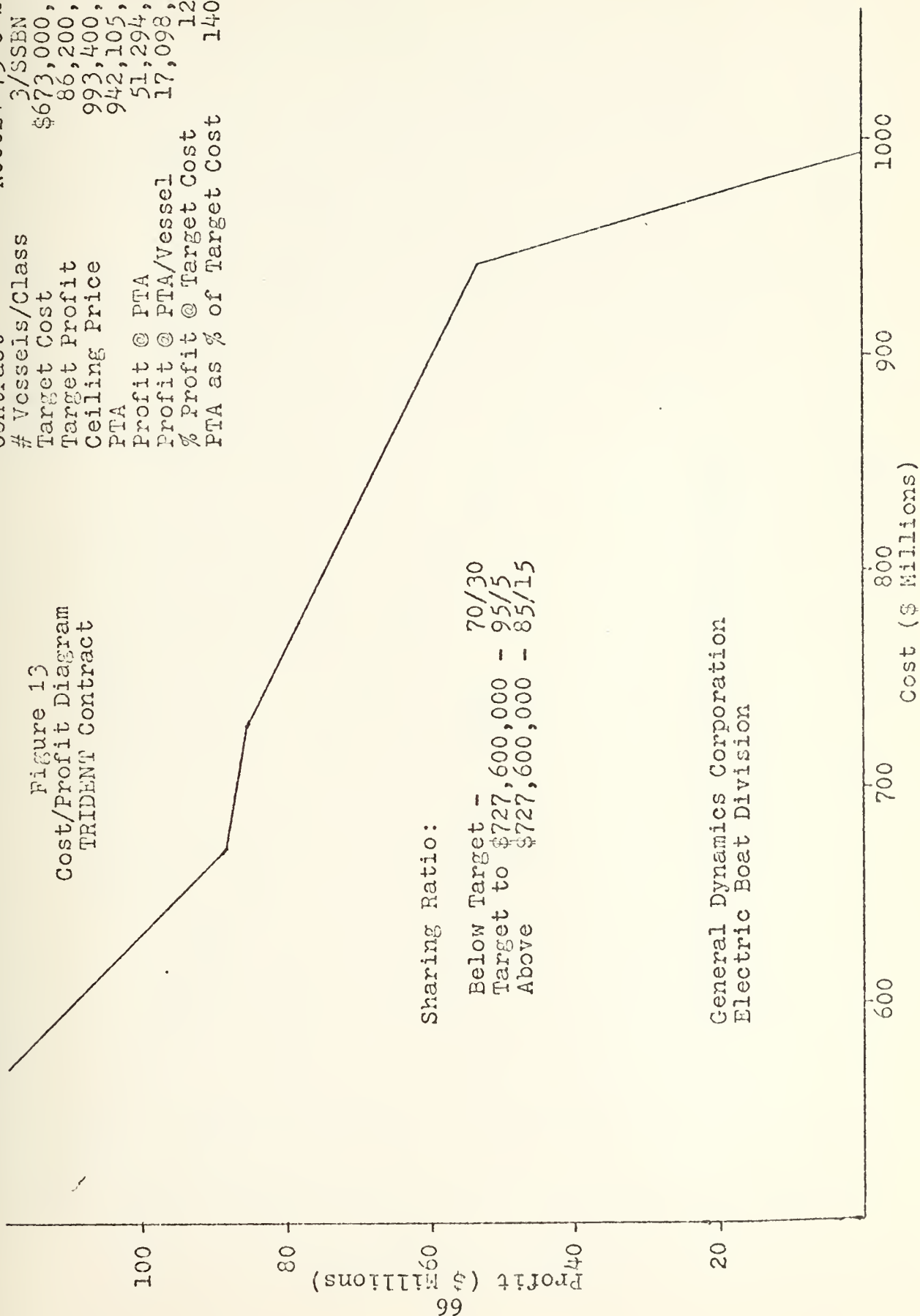
Contract N00024-75-C-2014  
 # Vessels/Class 3/SSBN 726  
 Target Cost \$673,000,000  
 Target Profit 86,200,000  
 Ceiling Price 993,400,000  
 PTA 942,105,882  
 Profit @ PTA 51,294,118  
 Profit @ PTA/Vessel 17,098,039  
 % Profit @ Target Cost 12.81  
 PTA as % of Target Cost 140.00

Figure 13  
 Cost/Profit Diagram  
 TRIDENT Contract

Sharing Ratio:

Below Target - 70/30  
 Target to \$727,600,000 - 95/5  
 Above \$727,600,000 - 85/15

General Dynamics Corporation  
 Electric Boat Division





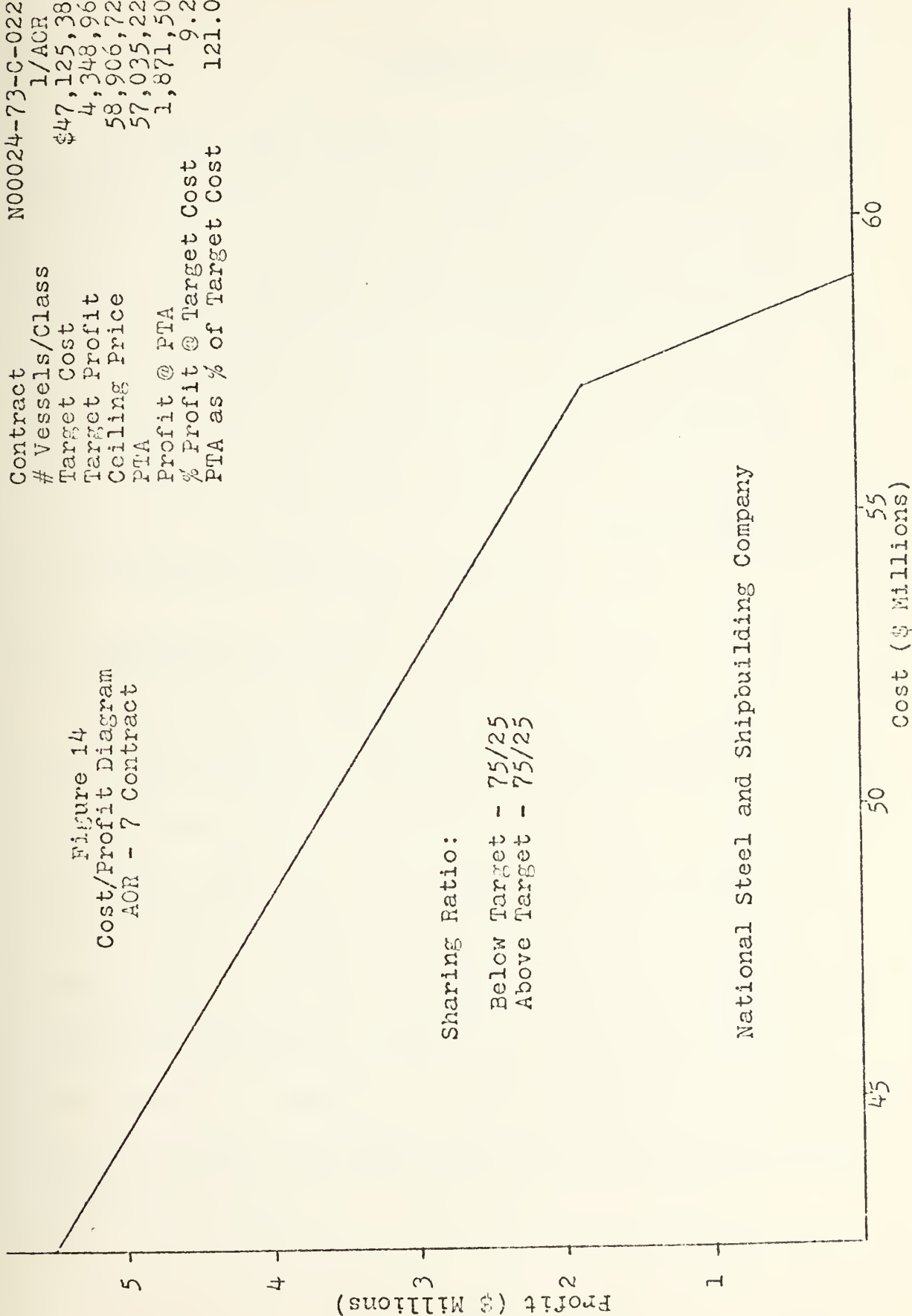
Contract N00024-73-C-0227  
 # Vessels/Class 1/ACR 1  
 Target Cost \$47,125,383  
 Target Profit 4,348,964  
 Ceiling Price 58,906,727  
 PTA 57,035,223  
 Profit @ PTA 1,871,504  
 % Profit @ Target Cost 9.23  
 PTA as % of Target Cost 121.03

Figure 14  
 Cost/Profit Diagram  
 AOR - 7 Contract

Sharing Ratio:

Below Target - 75/25  
 Above Target - 75/25

National Steel and Shipbuilding Company





## VI. PROFIT PROFILES

Although target profit is expressed in terms of a percentage of target cost, the respective purchasing power of a dollar of profit and a dollar of cost are not equal. Target profit as stated in the contract is the sum of a potential stream of profit without regard to the time value of money. Any further analysis of profit, therefore, requires that profit be examined in terms of when it is to be received. This chapter will describe how profit profiles for selected contracts were developed.

### A. ESTIMATING PROGRESS

The development of a profit profile for a contract requires the estimation of progress. As will be demonstrated, an estimation of progress can be related to estimated expenditures over time by equating physical progress with cost progress. As discussed in Chapter III, the 1962 standard escalation clause contains estimated expenditure curves of escalatable cost for both labor and material. These provide a reasonable basis for estimating progress since we do not have access to the contractor's estimated expenditure curves.



Use of the expenditure curves contained in the escalation clause requires that an adjustment be made to reflect those costs excluded from escalation coverage. As noted earlier these excluded costs generally represent less than 10% of target cost. It was assumed that these costs were incurred in direct proportion to escalatable costs. Percentage-of-completion was estimated according to the following formula:

$$\text{Percentage-of-Completion in Quarter } i = \frac{L_i + M_i}{\sum_{i=1}^n (L_i + M_i)}$$

Where:  $M_i$  is the % of target cost subject to escalation adjustment as material cost in quarter  $i$ .

$L_i$  is the % of target cost subject to escalation adjustment as labor cost in quarter  $i$ .

$n$  is the total number of quarters in the labor expenditure curve.

In order to substantiate the validity of this method of projecting progress, a comparison was made against the actual incurred cost for the 637-(4) contract. This data had been collected for use in the Study Report of Escalation in Navy Contracts. This study formed the basis for the development of the 1975 Clause.





Several adjustments to the data were required in order to arrive at a meaningful comparison. The technique described above to estimate progress is based upon constant dollars whereas the incurred costs represent inflated dollars of cost. The incurred cost breakdown consisted of quarterly costs for labor, material, and overhead. Since the exact split of overhead costs into labor and material was unknown it was not possible to express the incurred costs in terms of constant dollars. The alternative was to escalate the estimated contract costs according to the escalation clause. The quarterly adjustment for escalation was determined by using the actual BLS steel vessel indices for labor and material. The quarterly escalation adjustment was then combined with the product of target cost and the estimated quarterly percentage-of-completion. The quarterly costs based upon estimated progress and escalated in the above manner provide an equivalent basis for comparing estimated and actual cost progress.

One additional adjustment was required to account for contract changes reflected in the incurred costs. These costs could be treated as if they occurred at the end of the contract or throughout the entire contract. The adjustment to incurred costs for contract changes was based on



the former assumption. The assumption that costs resulting from contract changes are the last to be incurred would, if anything, overstate the actual cost progress.

Table VII provides a comparison of estimated progress and actual cost progress as adjusted in the preceding paragraphs.

Table VII

Comparison of Estimated and Cost  
Incurred Progress for the 637-(4) Contract

<u>Quarter</u>	<u>Estimated Progress</u>	<u>Progress Based on Incurred Costs</u>
1	0	0
2	3.8	2.2
3	9.5	4.5
4	15.4	9.0
5	21.1	14.6
6	26.7	22.6
7	32.6	30.5
8	39.3	38.5
9	46.5	46.2
10	54.4	53.1
11	62.6	61.5
12	70.3	69.5
13	77.2	77.8
14	83.5	84.9
15	88.7	90.7
16	93.6	94.3
17	97.4	97.2
18	99.4	98.5
19	100.0	100.0

Although statistical goodness of fit measures were not found to be appropriate, Table VII demonstrates that for this contract the method of estimating progress provides a



good approximation to progress based upon incurred cost. The differences which occur during quarters three through six are not considered serious, as variations prior to 50% completion have little impact on the profit profile. It is the author's opinion that this method will, if anything, overestimate progress. This opinion is based upon (1) the fact that the progress based on incurred cost is generally less than the estimated progress; and (2) the expenditure curves were a good approximation of incurred cost even with the vessels delivered early and at less than target cost.

#### B. CONTRACT MODEL

Initially, the author had planned to use a contract financing simulation model developed by Lt. Stephen Olson to project profit profiles. However, lack of access to proprietary data necessary to fully utilize its capabilities plus the need to correct what the author considered deficiencies in the model led to the rejection of this plan. Deficiencies in the Olson model arise from the way in which payments are determined. Progress payment thresholds are applied to base costs rather than incurred costs, and there is no differentiation as to delivery and guarantee payments.

In order to measure the impact of changes in progress payments procedures, projections of net investment as well as profit were required. Net investment is defined as



total incurred cost less total payments. All costs were treated as though they resulted from cash expenditures. A computer program was written to provide quarterly values for net investment and profit. The program was based upon the following algorithm:

1. Compute quarterly escalation
2. Compute estimated percent progress
3. Compute total incurred cost
4. Compute total payments
5. Compute net investment and profit
6. Print quarterly results.

Each step in the algorithm will be discussed.

#### 1. Compute Quarterly Escalation

The quarterly escalation adjustment was determined according to the escalation clause contained in the particular contract using either published BLS steel vessel indices or NAVSEA OIG projections of BLS indices made 15 July 1975 for future periods. The NAVSEA projections reflect the following annual percentage price level change, although they are made on a monthly basis:

	<u>Calendar Year</u>					
	75	76	77	78	79	80
Labor	14.4	10.0	8.7	3.1	6.2	6.2
Material	8.9	12.1	10.4	7.4	6.9	6.6

#### 2. Compute Projected Percent Progress

The projected percentage-of-completion is calculated according to the procedure outlined in the first section of this chapter.





### 3. Compute Total Incurred Cost

As noted earlier in this chapter, incurred costs refer to inflated costs. Total incurred costs are determined by adding the cumulative quarterly escalation adjustments to the product of target cost and the estimated percentage of completion.

### 4. Compute Total Payments

To project the impact of changes in progress payments procedures, payments were calculated according to six different sets of payment thresholds actually contained in shipbuilding contracts. The thresholds are differentiated according to the cost limitation on total payments and whether delivery payments are excluded from this limitation. The six thresholds are as follows:

Payments ceiling as % of incurred cost (progress less than 50%)	Payments ceiling as % of incurred cost (progress 50% or greater)	Delivery payments exempt from cost ceiling
105	105	No
100	105	No
95	95	No
95	95	Yes
100	100	Yes
100	105	Yes

The above thresholds are portrayed chronologically to show the response to changes in progress payment policy. Progress payments subject to the above thresholds are based upon 90% of progress prior to 50% completion and 100% of



progress thereafter less 5% of the contract price. Delivery payments are equal to 3% of vessel price and guarantee payments equal to 2% of vessel price. A reserve for final settlement of \$100,000 is withheld from the delivery payment of the first vessel and is paid upon expiration of the guarantee period for the last vessel. A guarantee period of eight months was assumed commencing upon delivery.

Escalation payments are based upon the adjustments calculated in step one. Escalation payments equal the escalation adjustment subject to the cost incurred limitation on total payments.

The exemption of delivery payments from the 95% and 105% cost incurred ceiling requires the determination of the amount of escalation adjustment attributable to each delivered vessel. The use of the escalation clause to inflate cost provides incurred costs on a total contract basis only. The amount of escalation adjustment attributable to each complete vessel was approximated by applying the percentages for the individual vessels determined from the projected escalation contained in the NAVSHIPS 7303-17 Reports of the cost of each vessel.

##### 5. Compute Net Investment and Profit

As previously defined, net investment is the difference between incurred cost and total payments received. Net



investment was determined as of the end of each quarter by subtracting the total of all payments from total incurred costs. The profit received each quarter was the amount by which quarterly payments exceeded quarterly cost.

#### 6. Print Quarterly Results

In addition to the net investment and profit, the percentage-of-completion and total escalation adjustment were printed for each quarter of the contract. The format of the printout is as follows:

<u>Quarter</u>	<u>Complete</u>	<u>Escalation</u>	<u>Net Investment</u>	<u>Profit</u>
----------------	-----------------	-------------------	-----------------------	---------------

#### C. GENERATION OF SELECTED CONTRACT PROFIT PROFILES

Profit profiles were generated for the following seven contracts:

<u>Contract</u>	<u>Date</u>	<u>Length in Months</u>
DLGN-36	6/68	59
637-(4)	6/68	57
637-(2)	7/69	56
688-I(NN)	1/71	66
688-I(EB)	1/71	78
DLGN-38	12/71	69
688-II	10/73	87

These contracts were selected on the basis of achieving a broad span of contract dates, variety of length of performance and a preference for multiple contracts involving similar vessels.



Profit profiles were generated for each contract based upon each of the six thresholds described earlier using the series of index values specified in the escalation clause. One additional profile for each contract was generated based upon the payment thresholds contained in the payment clause and the projected BLS steel vessel indices used in the 688-II contract. This was accomplished by adjusting the escalation clause dates such that the first quarterly period was coincidental to that of the 688-II contract. These profiles were useful in making comparisons based upon the same index value.

Excluding payment thresholds, and with three exceptions, the profit profiles were based upon the provisions of the escalation and payments clauses contained in the contract. The first exception is that progress payments in the DLGN-36 contract were based upon target price, not ceiling price. The second exception is that in this same contract progress payments were computed on a total contract basis rather than on an individual vessel basis. The third exception is that the labor multiplier was not used in determining the escalation adjustment in the DLGN-38 contract.

The profit profiles generated under the various conditions stated above are contained in Appendix C. In the next chapter





various measures will be applied to these profiles in order to determine the impact of the payment thresholds as well as the erosion of purchasing power due to inflation.



## VII. MEASURES OF PROFIT EROSION

As noted in Chapter IV profitability is primarily measured in terms of return on investment. The use of this measure was precluded by lack of access to information regarding contractor investment. Additionally, uncertainties would have resulted from the allocation of investment in facilities to specific contracts as well as the determination of the working capital requirements of the contract. The cash flow analysis required to accurately determine the working capital requirements for a particular contract is not a simple matter or a subject that is well understood.

It is the author's opinion that the Navy's capability for conducting a cash flow analysis is limited. This opinion is based upon a review of the cash flow statements required to be submitted by the contractor in support of the progress payments on the 688-III contract. Furthermore, contractors are very reluctant to provide data regarding their cash flow.

The erosion of profit was first measured in two separate ways. Unlike return on investment which relates profit to investment, these measures relate the value of profit to time in different ways. First, the profit profile was



deflated by the consumer price index to determine the erosion in the purchasing power of profit. Second, the erosion of profit was measured in terms of the time value of money by discounting the profit profile at 15%. By assuming independence, the combined impact of these two separate measures was determined by discounting the deflated profit profile at 15%. Because of the method used to estimate progress, discounting the profit profile will tend, if anything, to understate the impact of changes in payment procedures. Recall from Chapter IV that the method of estimating progress would tend to overstate progress.

#### A. PURCHASING POWER EROSION OF PROFIT

In their statements regarding profit erosion, shipbuilders frequently stress the reduction in the purchasing power of profit resulting from inflation. The measurement of the reduction in purchasing power requires the use of a measure which reflects changes in price levels. From the stockholder's perspective, the consumer price index is the measure most frequently used to indicate relative purchasing power. The consumer price index was, therefore, selected as a measure by which to deflate each profit profile. The profit for each quarterly period was expressed in terms of the contract pricing date according to the following formula:



$$\text{Total Deflated Profit} = \sum_{i=1}^n P_i \times \frac{\text{CPI}}{\text{ACPI}_i}$$

Where:  $P_i$  is the profit for quarter  $i$ .

CPI is the value of the consumer price index for the base month of the contract.

ACPI is the average value of the three monthly consumer price indices for quarter  $i$ .

$n$  is the number of quarters in the profit profile.

The following annual percentage change in the consumer price index was assumed for future periods:

	Calendar Year		
	1976	1977	1978-81
Percent Change	7.8	6.6	5.2

The sum of the deflated profit for each profit profile expressed as a percent of target cost, is listed in Table VIII. The impact of the six payment thresholds are illustrated for each contract. The erosion in purchasing power can be made on a contract to contract basis by making comparisons within each payment threshold category. Table VIII illustrates that the profit percentages for the seven contracts as based on the actual thresholds contained in the payments clause have declined when measured in terms of purchasing power. Furthermore, comparisons within each





of the payment threshold categories illustrate this same declining trend in profitability. (See rows of Table VIII.)

Table IX illustrates the percentage reduction in target profit based upon the profit percentages contained in Table VIII. This removes the variation due to the negotiated profit rate encountered when making comparisons of the discounted profit percentage. Table IX illustrates the increased erosion of profit relative to preceding contracts. More important, however, is the relationship of erosion of profit in terms of purchasing power to the reduction in profit percentage resulting from escalation payments. The latter measure is also frequently used by shipbuilders to substantiate their statements regarding profit erosion. The erosion of profit as a result of escalation payments can be measured by the reduction in target profit to target cost percentage when escalation payments are combined with target cost. This measure appears as the first category of Table IX. It can be seen that the erosion of profit according to this measure, regardless of thresholds, is less than the erosion as measured in terms of purchasing power for each threshold category. The fact that profit is generally received only during the last half of the contract because of the payments procedure discussed in Chapter IV accounts for this difference.



As noted in Chapter VI, a profit profile was generated for each contract based upon the indices used in the 688-II contract. This was to provide a comparison of profit based upon the same indices. The deflated profit as a percent of target cost based on the thresholds contained in the payments clause of the respective contract for both the actual and adjusted escalation period are listed in reverse chronological order below:

	<u>688-II</u>	<u>DLGN-38</u>	<u>688-I (EB)</u>	<u>688-I (NN)</u>	<u>637-(2)</u>	<u>637-(4)</u>	<u>DLGN-36</u>
actual	6.90%	9.06%	8.06%	7.09%	7.78%	9.15%	10.35%
688-II indices		8.63%	7.58%	6.53%	6.85%	7.86%	8.85%

The above percentages further illustrate the impact of the increased rate of inflation particularly in the area of the earlier contracts.

Thus far consideration has not been given to the cost of financing associated with the increased investment resulting from the use of the 95% cost incurred limitation on total payments. To reflect the cost of this increase, a quarterly interest charge was computed based upon the prime interest rate in effect at the start of each quarter. This assumes that the shipbuilder is able to borrow at the prime interest rate and that there is no compensating balance



associated with this line of credit. The quarterly interest charge will, therefore, tend to understate the cost of the additional investment required. The prime rate assumed to be in effect for future periods is as follows:

	1976	1977	1978	1979	1980
Prime Rate (Percent)	7.0	6.4	6.0	5.0	5.0
Source: Presidential Budget FY 1976					

The quarterly interest charge was subtracted from the quarterly profit and the deflated profit determined as described previously. Table X lists the total interest charges and the deflated profit percentages resulting from this treatment of the additional investment resulting from the 95% payment thresholds.

The difference in the deflated profit percentages between the 105%/105% non-exempt and the 95%/95% exempt payment thresholds given this treatment of investment cost is as follows:

688-II	DLGN-38	688-I (EB)	688-I (NN)	637-(2)	637-(4)	DLGN-36
0.67%	1.06%	1.06%	1.03%	0.87%	0.67%	0.7%

The principle cause of the above variation is the high level of the prime interest rate for the period July 1973 to March 1975. Restating the above difference as a percentage reduction in the deflated profit percentage based upon the 105%/105% non-exempt payment thresholds results in the following:



688-II	DLGN-38	688-I (EB)	688-I (NN)	637-(2)	637-(4)	DLGN-36
--------	---------	---------------	---------------	---------	---------	---------

9.2%	11.6%	13.2%	14.5%	11.2%	7.3%	6.8%
------	-------	-------	-------	-------	------	------

These percentages reflect the reduction in terms of profit associated with the change in payments policy relative to the seven contracts.

#### B. DISCOUNTING AT 15%

An alternative measure of profitability is provided by the present value of the profit profile. Differences in the present value of profit on account of payment thresholds represent the opportunity cost associated with changes in payment policy. It should be noted that this measure of profitability does not involve the explicit treatment of inflation but rather measures the time value of money.

An important consideration in computing the present value of profit is the selection of an appropriate interest rate. A rate of 15% per year was selected. The selection of this rate is not without justification as will be seen. The payments clause in the DLGN-36 contract, as noted in Chapter IV, was modified to provide for payments on an individual vessel basis. The contractor reduced the contract price by \$120,000 to achieve this modification. The principle effect of this change was to exempt the delivery





payment for the first vessel from the ceiling on total payments. The 105%/105% exempt thresholds were used to approximate the profit profile for this contract. The difference between the present value based on the 15% interest rate for the profit profiles generated under the 105%/105% non-exempt and the 105%/105% exempt thresholds is \$118,000. It is the author's opinion that the price reduction offered by the contractor was based on this type of analysis.

The present value of each profit profile was computed according to the following formula:

$$PV = \sum_{i=1}^n P_i \times \frac{1}{(r)^i}$$

Where:  $i$  is the number of the respective quarter.

$P_i$  is the profit for quarter  $i$

$$r = \sqrt[4]{1.15}$$

$n$  is the total number of quarters in the contract.

The present value is expressed in terms of the month in which the contract was signed. Additionally, no adjustment was made for financing costs.

Table XI lists the present value of each profit profile. The percentage reduction in present value between the 105%/105% non-exempt and the 95%/95% exempt thresholds for each contract is as follows:



688-II	DLGN-38	688-I (EB)	688-I (NN)	637-(2)	637-(4)	DLGN-36
10.5%	9.6%	9.1%	8.8%	7.7%	8.5%	9.9%

These percentages reflect the reduction in terms of profit, when measured by present value at 15%, associated with the change in payments policy relative to the seven contracts.

Table XI indicates that the payment threshold of 100%/105% exempt, reflecting the current payments policy provide a present value that is larger than that of the 105/105 non-exempt thresholds. This same fact is illustrated in terms of profit percentage in Table VIII. Therefore, it can be concluded that the current payment policy, from the contractors viewpoint, is preferable to the policy in effect prior to the change in March of 1973.

The present value of profit at 15% expressed as a percentage of target cost for the profiles based on the actual payments clause thresholds for each contract are as follows:

688-II	DLGN-38	688-I (EB)	688-I (NN)	637-(2)	637-(4)	DLGN-36
4.89%	6.04%	5.73%	5.20%	5.46%	6.49%	7.55%

The decreasing profitability indicated above is caused by the length of the contract, the negotiated profit, and the payment thresholds. Removal of the effect of the difference in payment thresholds, however, does not change the trend of



declining profitability as illustrated below:

688-II	DLGN-38	688-I (EB)	688-I (NN)	637-(2)	637-(4)	DLGN-36
5.45%	6.13%	5.73%	5.20%	5.46%	6.49%	7.46%

The declining profitability is consistent with that shown by the previous measure of profitability used in this chapter.

A sensitivity analysis was not performed by determining the present value at lower rates of interest. The method of deflating profit is mathematically similar to the discounting technique and thus provides an indication of the results that would be obtained by discounting at lower rates of interest.

#### C. DISCOUNTING DEFLATED PROFIT AT 15%

The two previous measures have associated profit erosion from two separate considerations regarding the receipt of profit over time. These two, deflation and time value of money, can be combined by assuming they are independent measures. The present value of deflated profit was computed according to the following formula:

$$PV = \sum_{i=1}^n P_i \times \frac{\frac{CPI}{ACPI}_i}{(r)^i}$$

Where:  $i$  is the number of the respective quarter.



$P_i$  is the profit for quarter  $i$

$$r = \sqrt[4]{1.15}$$

CPI is the value of the consumer price index for the base month of the contract.

$ACPI_i$  is the average value of the three monthly consumer price indices for quarter  $i$ .

$n$  is the total number of quarters in the contract.

Table XII lists the present value of the deflated profit profile at 15% interest in terms of a percent of target cost. The percentages for the 95%/95% non-exempt and the 95%/95% exempt threshold categories have been adjusted for the interest charge described earlier. The profit percentage based upon the present value of deflated profit at 15% interest for the actual payments clause thresholds for each contract are as follows:

688-II	DLGN-38	688-I (EB)	688-I (NN)	637-(2)	637-(4)	DLGN-36
--------	---------	---------------	---------------	---------	---------	---------

2.67%	4.25%	3.98%	3.72%	4.33%	5.26%	6.06%
-------	-------	-------	-------	-------	-------	-------

This combined measure shows not only the declining trend in profitability, but the dramatic extent to which profit is eroded. These figures illustrate that the concern of shipbuilders regarding the erosion of profit on Navy contracts is justified.





#### D. SUMMARY

There are two conclusions of major significance that can be made based upon the three measures of profitability used in this chapter. These conclusions are as follows:

1. The current payments policy is preferable, relative to the payment of profit, than the policy that existed prior to March of 1973.
2. Profitability of the seven contracts measured relative to time has declined.

In the following chapter three approaches for reducing the erosion of profit due to price level change will be discussed. Failure to address this problem will result in shipbuilder's negotiating higher contract profit rates or a further decline in shipbuilder interest in Navy shipbuilding.



TABLE VIII

## PROFIT PERCENTAGE

	688-II	DLGN-38	688-I EB	688-I NN	637-2	637-4	DLGN-36
Profit/Target Cost (TC)	11.90	12.74	11.90	10.00	10.00	11.35	12.99
Profit/TC + Escalation	7.65	10.06	9.30	8.22	8.83	10.10	11.09
Deflated Profit/TC 105/105 Not Exempt	7.27	9.12	8.06*	7.09*	7.78*	9.15*	10.31
Deflated Profit/TC 100/105 Not Exempt	7.23	9.06*	8.03	7.09	7.78	9.14	10.28
Deflated Profit/TC 95/95 Not Exempt	6.68	8.42	7.37	6.62	7.38	8.89	10.00
Deflated Profit/TC 95/95 Exempt	6.99*	8.63	7.69	6.72	7.41	8.96	10.05
Deflated Profit/TC 100/100 Exempt	7.20	8.80	7.88	6.84	7.47	9.02	10.10
Deflated Profit/TC 100/105 Exempt	7.32	9.24	8.19	7.11	7.79	9.17	10.33
Deflated Profit/TC 105/105 Exempt	NA	NA	NA	NA	NA	NA	10.35*

Deflator = CPI

\*Actual Threshold Contained in Payments Clause



TABLE IX

PERCENT EROSION OF TARGET PROFIT  
(BASED ON PERCENTAGE PROFIT LISTED IN TABLE VIII)

	688-II	DIGN-38	688-I EB	688-I NN	637-2	637-4	DIGN-36
Profit/Target Cost + Escalation	35.70	21.05	21.85	17.76	11.69	11.02	14.64
Deflated Profit/TC 105/105 Not Exempt	38.92	28.44	32.26*	29.12*	22.21*	19.44*	20.66
Deflated Profit/TC 100/105 Not Exempt	39.23	28.92*	32.52	29.12	22.21	19.49	20.84
Deflated Profit/TC 95/95 Not Exempt	43.84	33.97	38.06	33.78	26.25	21.73	23.00
Deflated Profit/TC 95/95 Exempt	41.26*	32.28	35.40	32.83	25.91	21.04	22.66
Deflated Profit/TC 100/100 Exempt	39.48	30.97	33.82	31.57	25.35	20.59	22.26
Deflated Profit/TC 100/105 Exempt	38.51	27.49	31.15	28.86	22.10	19.26	20.50
Deflated Profit/TC 105/105 Exempt	NA	NA	NA	NA	NA	NA	20.31*

Deflator = CPI

\*Actual Threshold Contained in Payments Clause



TABLE X

## INTEREST CHARGE AND ADJUSTED PERCENTAGE PROFIT

	Interest Charge X (\$000)						
	688-II	DLGN-38	688-I EB	688-I NN	637-2	637-4	DLGN-36
95/95 Not Exempt	\$7614	\$2964	\$5860	\$3089	\$634	\$1127	\$894
95/95 Exempt	\$4323	\$1781	\$3170	\$2156	\$525	\$835	\$696
Interest Rate = Prime Rate							
Adjusted Percentage Profit (Deflated Profit Less Interest Charge)							
Deflated Profit/TC 95/95 Not Exempt	6.06	7.55	6.39	5.70	6.75	8.24	9.46
Deflated Profit/TC 95/95 Exempt	6.60	8.06	7.00	6.02	6.88	8.48	9.61

Deflator = CPI





TABLE XI

PRESENT VALUE OF PROFIT @ 15% x (\$000)

	688-II	DIGN-38	688-I EB	688-I NN	637-2	637-4	DIGN-36
Target Profit	81873	28800	43914	22513	8000	15700	16500
Present Value 105/105 Not Exempt	37592	13848	21155*	11700*	4369*	8972*	9476
Present Value 100/105 Not Exempt	37130	13640*	20932	11699	4369	8955	9396
Present Value 95/95 Not Exempt	29634	11945	17628	10350	4015	8212	8416
Present Value 95/95 Exempt	33654*	12524	14227	10666	4031	8218	8535
Present Value 100/100 Exempt	36625	12981	20154	10348	4072	8334	8670
Present Value 100/105 Exempt	38249	14135	21747	11769	4393	9131	9514
Present Value 105/105 Exempt							9595*

\*Actual threshold contained in Payments Clause



TABLE XII

PRESENT VALUE OF DEFLATED PROFIT @ 15% x (\$000) AS PERCENT OF TARGET COST

	688-II	DLGN-38	688-I EB	688-I NN	637-2	637-4	DLGN-36
Target Profit/TC	11.90	12.74	11.90	10.00	10.00	11.35	12.97
Present Value/TC 105/105 Not Exempt	3.39	4.37	3.98*	3.72*	4.33*	5.26*	5.96
Present Value/TC 100/105 Not Exempt	3.31	4.25*	3.91	3.72	4.33	5.24	5.89
Present Value**/TC 95/95 Not Exempt	2.19	3.13	2.56	2.62	3.42	4.21	4.83
Present Value**/TC 95/95 Exempt	2.67*	3.48	3.09	2.83	3.48	4.42	4.96
Present Value/TC 100/100 Exempt	3.23	3.90	3.63	3.35	3.84	4.82	5.31
Present Value/TC 100/105 Exempt	3.44	4.48	4.12	3.75	4.34	5.38	5.98
Present Value/TC 105/105 Exempt	NA	NA	NA	NA	NA	NA	6.06*

DEFLATOR = CPI

\*Actual threshold contained in Payments Clause

\*\* Adjusted for interest charge



## VIII. RECOMMENDATIONS

This paper has identified those contractual provisions which determine the impact of inflation on contract profit. It can be argued that shipbuilders take into account the erosion of profit as a result of these provisions when establishing a contract profit objective. This, in effect, represents a form of contingency pricing. This method is satisfactory providing the erosion of profit can be accurately predicted and the negotiated profit percentage adjusted accordingly. The decline in profit as measured in Chapter VII illustrates that shipbuilders have either underestimated the degree to which profit is eroded or have been unsuccessful in negotiating profit percentages to preclude the decline in profit relative to other contracts. This result of contingency pricing if continued will have serious consequences on the Navy's shipbuilding program.

An alternative to contingency pricing is the use of escalation provisions. The Navy, as one of the major users of escalation provisions, has long recognized the advantage resulting from the use of escalation provisions in shipbuilding contracts as compared with the use of contingency pricing.



This same advantage can result from the application of escalation provisions to profit. The escalation of profit is not incompatible with the use of the "weighted guidelines" procedure, which do not provide for the explicit treatment of the timing of the payment of profit in establishing a negotiating profit objective.

There are three general approaches to the application of escalation provisions to profit. These general approaches are: (1) include an element of profit in existing cost escalation provisions, (2) escalate actual profit earned upon completion of the contract, and (3) separate escalation of target profit. Each of these general approaches will be discussed.

#### A. INCLUDE ELEMENT OF PROFIT IN EXISTING COST ESCALATION PROVISIONS

This method encompasses the recommendations, noted in Chapter II, of the Logistics Management Institute and the Council of Defense and Space Industry Associates. The administrative consideration associated with the application of this method to the 1975 escalation clause is negligible. A separate element of profit would be included in the escalation payment based upon the application of a predetermined percentage to the separate calculations made for the adjustment based upon labor and material.





The strongest argument used against this method of providing escalation coverage to profit is that it may be prohibited by ASPR due to the ban on cost plus percentage of cost contracts. The essence of this argument is that the inclusion of an element of profit in cost escalation payments somehow results in a cost plus percentage of cost contract. In the author's opinion the above argument is indicative of a misunderstanding of the basis for making escalation payments.

The rationale for this approach remains based upon the percentage of cost method of determining profit. This method represents an attempt to equate profit to a percentage of forward-priced costs. It is the author's opinion that the strongest reason for not adopting this approach is illustrated in Chapter VII. The timing of receipt of escalation payments over the life of the contract is significantly different than that of the receipt of profit. If the purpose of providing escalation on profit is to maintain the purchasing power of target profit, then this method contains a serious deficiency.



## B. ESCALATE ACTUAL PROFIT EARNED

This approach represents the method envisioned in the last paragraph of Appendix A. It involves the use of a one-time adjustment based upon the application of an appropriate index to the profit actually earned at completion of the contract. A profit profile would be constructed based upon an analysis of costs incurred and payments received to determine the actual payment of profit on a quarterly basis. The adjustment would be calculated based upon the following formula:

$$\text{Adjustment} = \sum_{i=1}^n P_i \times \frac{I_i}{I_o}$$

Where:  $P_i$  is the profit paid in quarter  $i$  (note  $P_i$  cannot be less than zero.)

$I_i$  is the average value of an appropriate index for quarter  $i$ .

$I_o$  is the value of the index at the time the contract is signed.

$n$  is the number of quarters until the contract is completed.

The administration of this method, although not as simple as the previous approach, is not difficult. The primary weakness of this method is that it provides



escalation only on earned profit. This would result in different treatment of contractors based upon cost performance. For example, those contracts which resulted in a loss or zero profit would receive no adjustment. The advantage of this method is that it would maintain the purchasing power of the percentage of target profit actually earned. This method, however, is contingent upon the contractor's willingness to wait until completion of the contract for the adjustment. Present value theory says that the contractor would be willing to accept a reduced amount at an earlier point in time.

#### C. SEPARATE ESCALATION OF TARGET PROFIT

The separate escalation of target cost could be accomplished through the use of a predetermined profit profile reflecting the percentage of target profit projected to be paid in each quarter of the contract. The profit profile would be based upon the thresholds in the payments clause actually contained in the contract. The use of a predetermined profit profile is required because the actual payment of profit over time cannot be determined until the contract is complete.

Separate quarterly payments would be made based upon the following formula:



$$\text{Quarterly Payment} = P_i \times \frac{I_i}{I_o}$$

Where:  $P_i$  is the product of target profit and the percentage for quarter  $i$  contained in the predetermined profile.

$I_i$  is the average of the appropriate index for the quarter  $i$ .

$I_o$  is the value of the index on the date the contract is signed.

These payments, unlike the adjustment provided in the preceding approach, would be made outside of the incentive price revision formula, as are cost escalation payments. Additionally, like cost escalation payments they would be terminated when the sum of total payments less total escalation payments equaled ceiling. The advantage of this approach is that all contractors would be afforded equal treatment. Additionally, the payment of the adjustment would be consistent with the payment of profit anticipated at the outset of the contract.

All three of these approaches are compatible with contractual provisions currently in use. It should not be assumed, as is implied in Appendix A, that the use of any of these approaches would result in extra profit in all





cases. The contractor, particularly in competitive procurements, will adjust his proposal price based upon his projection of profit. Providing escalation coverage to profit will deny the contractor the excuse for including a contingency in his profit objective to offset the erosion of profit as a result of inflation.

These approaches present three options for reducing the erosion of profit as a result of inflation. It is the author's opinion that they are presented in increasing order of preferability. It is recommended that one of these approaches be implemented in Navy shipbuilding contracts.



## APPENDIX A

From: Commandern Naval Sea Systems Command  
To: Chief of Naval Material

Subj: Profit Objectives on Shipbuilding Contracts

1. The issue discussed in your memorandum of 17 April 1975 raises a provocative question which is difficult to answer. Although we have some thoughts on the matter, which will be expressed below, it seems that the issue has such broad ramifications that it should be pursued at the DOD level. All Services must use Economic Price Adjustment provisions to some extent. Therefore, there should be a consistent Service wide approach, if a workable technique can be developed to recognize profit on escalation recovery.

2. After much deliberation, we have concluded that there is no apparent way to produce more profit through escalation recovery generated by the Economic Price Adjustment clause used in Shipbuilding contracts, especially if they are procured competitively. In competitive procurements, contractor selection is based on comparisons of the proposed target prices. For whatever the motivation, if a contractor chose a low profit rate, we would not question its reasons. A real example of such a thing happening is in the overhaul of the DLG-10, where Bath's cost estimate was lower than Boland's, but because Boland proposed a lower profit rate, its target price was lower than Bath's. Therefore, it would not be logical to unilaterally tack on extra profit to escalation recoveries, when the low offeror had no expectation of receiving such a bonus. It is appropriate to note that most of our major ship acquisition programs which invariably use escalation provisions, are competitive.

3. In a sole source procurement, the situation is different, as profit on escalation could be computed. However, it would be inconsistent to allow additional profit in a sole source situation, where, presumably, the contractor will get a higher "going-in" profit, but not allow for extra profit in a competitive procurement where the risk is the same.

4. Implicit in your inquiry is the assumption that low profitability is caused by the exclusion of escalation from the base for profit computation, yet there is no known study which would bear this out. Possibly, the DOD "Profit 76" study will address this issue. Further, in keeping with the stated profit policy of the Department of Defense to shift the risk of contract



## APPENDIX A

costs to the fullest extent practicable to contractors, we would recommend against a policy which would allocate profit to a contract conditions designed to minimize contingency pricing.

5. A concept we have considered is to, in some manner, escalate realized profit by applying a BLS index to compensate for the erosion of profit dollars caused by inflation over an extended period of time. This idea is nebulous, but possibly worth pursuing.

S.T. Counts  
Acting Commander,  
Naval Sea Systems Command



## APPENDIX B

### ARTICLE 8. COMPENSATION ADJUSTMENTS (LABOR AND MATERIAL)

(a) Regardless of the actual changes in the cost of labor or materials during the performance of this contract, adjustments in compensation shall be made as provided in paragraphs (b) and (c) of this Article. Said adjustments are based solely on the changes in the Labor Index identified in paragraph (b) of this Article and the Material Index identified in paragraph (c) of this Article. Each Supplemental Agreement entered into pursuant to this Article shall set forth the calculations upon which the adjustments in compensation are made. For the purposes of this Article, 33.0% of the Target Cost shall be deemed to constitute the labor cost subject to adjustment and shall be apportioned as shown in the second column of Table 1 of paragraph (b) hereof. Similarly, 61.0% of the Target Cost shall be deemed to constitute the material cost subject to adjustment and shall be apportioned as shown in the second column of Table 2 of paragraph (c) hereof. No part of said Tables 1 and 2 shall be revised, unless this contract is partially terminated and then only as provided in subparagraph (f) (2) of this Article.

(b) Adjustments in compensation on account of changes in labor cost shall be made as follows for each quarterly period shown in the first column of Table 1 for this paragraph based on the changes in the Nationwide "Index of Changes in Straight Time Average Hourly Earning for Selected Shipyards" (June 1962 equals 100) for steel ship construction herein sometimes called the "Labor Index", furnished to the Naval Ship Systems Command by the Bureau of Labor Statistics of the United States Department of Labor:

(1) The Labor Index for the base month of April 1972 shall be subtracted from the Labor Index for the quarterly period involved, determined in accordance with paragraph (d) below, and the difference computed as a plus or minus figure, as the case may be.

(2) The aforesaid difference, whether plus or minus, shall be divided by the Labor Index for the base month and the resulting quotient carried to four decimal places.

(3) The aforesaid quotient shall be multiplied by the percentage of the Target Cost set forth in the third column of Table 1 below, opposite the quarterly period involved, and the resulting product carried to six decimal places.

(4) The aforesaid product shall be multiplied by \$(Target Cost). The resulting amount shall constitute the amount of the adjustment in compensation for the quarterly period involved.





## APPENDIX B

(5) The amount of the adjustment in compensation shall be upwards or downwards depending upon whether the difference in the labor indices calculated in subparagraph (1) above is a plus or minus figure, as the case may be, and shall be set forth in a Supplemental Agreement to this contract.

<u>Qtr</u>	<u>MATERIAL 61.0% of Target Cost</u>		<u>LABOR 33.0% of Target Cost</u>	
	<u>% of</u> <u>Material</u>	<u>% of</u> <u>Target Cost</u>	<u>% of</u> <u>Labor</u>	<u>% of</u> <u>Target Cost</u>
1	2.5	1.5	0.4	0.1
2	8.5	5.1	0.8	0.3
3	18.0	11.0	1.2	0.5
4	20.0	12.2	3.0	1.0
5	16.0	9.8	6.8	2.2
6	11.0	6.7	9.5	3.2
7	8.0	4.9	13.1	4.3
8	7.0	4.3	15.5	5.1
9	5.0	3.1	17.3	5.7
10	3.0	1.8	15.6	5.1
11	1.0	0.6	12.2	4.0
12	-	-	4.6	1.5
	<u>100.0%</u>	<u>61.0%</u>	<u>100.0%</u>	<u>33.0%</u>

(c) Adjustments in compensation on account of changes in material costs shall be made for each quarterly period shown in the first column of Table 2 below, based on the changes in the "Material Index for Naval Ship Systems Command Steel Vessels Contract", herein sometimes called the "Material Index", furnished to the Naval Ship Systems Command by the Bureau of Labor Statistics of the United States Department of Labor:

(1) The Material Index for the base month of April 1972 below, shall be subtracted from the Material Index for the quarterly period involved, determined in accordance with paragraph (d) below, and the difference computed as a plus or minus figure, as the case may be.

(2) The aforesaid difference, whether plus or minus, shall be divided by the Material Index for the base month and the resulting quotient carried to four decimal places.

(3) The aforesaid quotient shall be multiplied by the percentage of the Target Cost set forth in the third column of Table 2 below, opposite the quarterly period involved, and the resulting product carried to six decimal places.



## APPENDIX B

(4) The aforesaid product shall be multiplied by \$(Target Cost). The resulting amount shall constitute the amount of the adjustment in compensation for the quarterly period involved.

(5) The adjustment in compensation shall be upwards or downwards depending upon whether the difference in the material indices calculated in accordance with subparagraph (1) above is a plus or minus figure, as the case may be, and shall be set forth in s Supplemental Agreement to this contract.

(d) For the purpose of this Article:

(1) The first quarterly period shall commence on the first day of the calendar month following the effective date of the contract.

(2) The term "Target Cost ", as referred to herein, shall be the target cost in effect at the effective date of this contract.

(3) For the purposes of computing the amount of adjustment in compensation the amount of Target Cost set forth in subparagraphs (b) (4), and (c) (4) shall not be revised unless this contract is partially terminated and then only to the extent provided in paragraph (f) (2) of this Article.

(4) The Labor Index and Material Index for a quarterly period shall be the arithmetical average carried to one decimal point of the Labor Index, or the Material Index, as the case may be, for each of the three months comprising such quarterly period.

(e) Nothing contained in this Article shall be construed as prohibiting the inclusion of changes in the cost of labor or material in any adjustment in the target cost, target profit, target price, ceiling price or total final price provided for under any other provision of this contract.

(f) (1) If this contract is terminated in whole, for any reason, no compensation shall be made under this Article for any quarterly period subsequent to the quarterly period during which the contract is terminated.

(2) In the event that this contract is terminated in part, and such partial termination terminates the completion of one or more vessels then, notwithstanding any other provision of this Article, the target cost set forth in paragraphs (b) and (c), the percentages of target cost set forth in paragraph (a), and each column of Table 1 of paragraph (b) and Table 2 of paragraph (c) shall be adjusted for the reduction in the number of vessels to be completed under this contract.



## APPENDIX B

Deferred payments for escalation shall be paid promptly, upon submission of invoices, whenever such payment, when added to the total of all payments previously made under the contract, would not exceed ninety-five percent (95%) of the costs certified by the Contractor on such invoice to have been incurred by it in the performance of the contract. Upon delivery of the last vessel under this contract, any remaining deferred payments for escalation shall, upon submission of invoices, be promptly paid. In the event that the amount shown in any Supplemental Agreement pursuant to paragraphs (b) and (c) above is a minus figure, such amount shall be deducted from the next invoice(s) presented for payment under this contract until such amount has been offset or recouped in full.

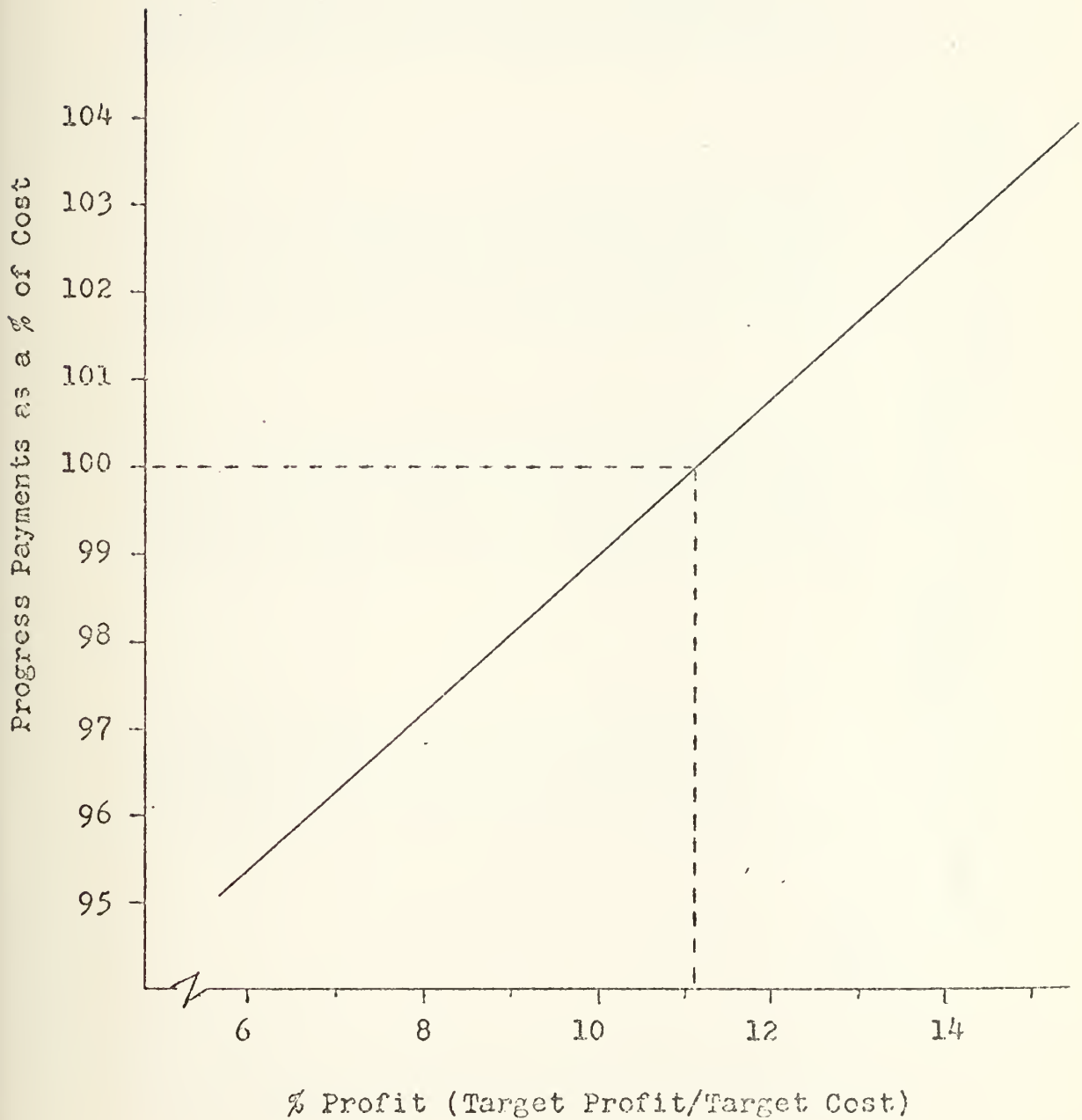
(h) No adjustment shall be made in the target cost, target price, or ceiling price on account of upwards or downwards adjustment in compensation made in accordance with this Article and hence said adjustments are outside the incentive price revision formula provided for in Article 8, "INCENTIVE PRICE REVISION (FIRM TARGET)." Accordingly, even if the ceiling price is exceeded, amounts otherwise payable to the Contractor in accordance with this Article shall continue to be paid.

(i) Any dispute arising under this Article shall be determined in accordance with provisions of the "DISPUTES" clause of the contract.



APPENDIX C

Progress Payments Based  
upon 90% of Progress as  
a Function of Percent  
Profit







# APPENDIX D

CURPTE	COMPLUTE	SEALATION	NET INVESTMENT	PROFIT
1	01075277	5557367	-2479	52479
2	03870377	3195927	-103228	136449
3	05275377	1081600	-49348	135120
4	12535277	1052777	-629728	225680
5	1723973	33579960	-333664	209736
6	3146237	45610100	-133903	199424
7	275257	434831400	-1343479	152072
8	3321533	735674300	-1343479	141715
9	3321533	735674300	-1521623	131200
10	3321533	735674300	-1521623	146944
11	3321533	735674300	-1521623	146896
12	3321533	735674300	-1521623	146880
13	3321533	735674300	-1521623	146844
14	3321533	735674300	-1521623	178432
15	3321533	735674300	-1521623	194304
16	3321533	735674300	-1521623	1538330
17	3321533	735674300	-1521623	3697410
18	3321533	735674300	-1521623	5797120
19	3321533	735674300	-1521623	7096830
20	3321533	735674300	-1521623	7733628
21	3321533	735674300	-1521623	9395600
22	3321533	735674300	-1521623	4449530
23	3321533	735674300	-1521623	2455550
24	3321533	735674300	-1521623	1752060
25	3321533	735674300	-1521623	1502460
26	3321533	735674300	-1521623	1243090
27	3321533	735674300	-1521623	562432
28	3321533	735674300	-1521623	56352
29	3321533	735674300	-1521623	2483740
30	3321533	735674300	-1521623	1399660
31	3321533	735674300	-1521623	1506370
32	3321533	735674300	-1521623	1506370
33	3321533	735674300	-1521623	1506370
TOTAL				PROFIT
				81872900

Contract 688-II  
 Payments Clause Thresholds 105/105 Not Exempt



# APPENDIX D

QUARTER	COMPLETION	ESCALATION	NET INVESTMENT	PROFIT
1	0.07527	327260	0	0
2	0.081007	3109600	0	0
3	0.081007	10081000	0	0
4	0.080827	22527000	0	0
5	1.000000	34132700	0	0
6	2.12927	45180000	0	0
7	2.46227	55101000	0	0
8	2.75260	64833000	0	0
9	3.00151	72809000	0	0
10	3.20253	80076000	0	0
11	3.40366	86295000	0	0
12	3.50372	105122000	0	0
13	3.50591	116410000	0	0
14	3.5014	130660000	0	0
15	3.50320	146751000	0	0
16	3.51026	165027000	-7073370	7973370
17	3.51707	184540000	-11709000	3607410
18	3.52053	205730000	-17437900	5797120
19	3.52740	227500000	-24564700	7096800
20	3.54230	260240000	-32303400	7723320
21	3.55667	300500000	-41400000	9205600
22	3.56407	346610000	-46053500	4440500
23	3.57626	364100000	-50460000	2450500
24	3.581001	377000000	-51700000	1030000
25	3.58065	380510000	-52165000	1530000
26	3.58063	380040000	-52165000	1240000
27	3.58063	380040000	-52165000	1240000
28	3.58063	380040000	-52165000	1240000
29	3.58063	380040000	-52165000	1240000
30	3.58063	380040000	-52165000	1240000
31	3.58063	380040000	-52165000	1240000
32	3.58063	380040000	-52165000	1240000
TOTAL PROFIT				1500000

Contract 688-II  
 Payments Clause Thresholds 100/105 Not Exempt



# APPENDIX D

CHAPTER	COMPLETION	ESCALATION	NET INVESTMENT	PROFIT
1	0107527	837360	394732	0
2	0331097	3100600	1491700	0
3	0827057	10991700	3397500	0
4	120343	22327500	5565450	0
5	170043	34192000	7623330	0
6	212933	45794000	9412000	0
7	246237	55610000	11551700	0
8	275233	64931000	13711500	0
9	302151	73860000	14032000	0
10	332253	83074000	15623000	0
11	362376	94332500	17135500	0
12	392472	105100000	18761100	0
13	422591	116410000	20352700	0
14	45274	127660000	22223000	0
15	483025	137760000	23500000	0
16	513336	145020000	24754000	0
17	537007	156344000	26430000	0
18	562253	205763000	32333400	0
19	57742	227520000	34691100	0
20	564820	266243000	36230000	0
21	517205	289521000	43060000	0
22	566677	224373000	46500000	0
23	506452	266610000	48510000	0
24	537235	366100000	50447100	0
25	551291	377900000	51060000	0
26	503545	390140000	53217500	0
27	582243	394245000	53200000	0
28	504624	392200000	54125600	0
29	1	601000000	-73972700	73972700
30	1	601000000	-72572700	0
31	1	601000000	-60272500	1299360
32	1	401000000	-31272000	1577370
TOTAL PROFIT				
010/2000				

Contract 688-II  
 Payments Clause Thresholds 95/95 Not Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0107527	537360	396737	0
2	0387057	3199620	1491700	0
3	0827957	10981000	3397500	0
4	129032	22527900	5565450	0
5	172043	34192700	7620330	0
6	212903	45785600	5613920	0
7	246237	55610130	11251700	0
8	275269	64831400	12711500	0
9	302151	73269730	14083200	0
10	332258	83974800	15622200	0
11	362306	94323500	17185500	0
12	392373	105183000	18761100	0
13	422581	115411000	20358700	0
14	45914	130646000	22328100	0
15	499225	146751000	24502000	0
16	541936	165027000	26905000	0
17	587097	184344000	29711000	0
18	632258	205760000	32922000	0
19	67742	227222000	36339000	0
20	754835	260246000	40223900	0
21	817205	298521000	44113100	13113100
22	860367	324375000	48093200	0
23	909452	346611000	52142100	8307920
24	957635	364199000	56060700	10539700
25	961291	377579000	60055200	11095400
26	980345	389514000	641803400	0
27	989249	394346000	68952700	10396500
28	994624	398350000	74111300	12453600
29	1	401920000	78972700	12561400
30	1	401920000	83972700	0
31	1	401920000	890372500	1399860
32	1	401920000	941872900	1500370
TOTAL PROFIT				
81872900				

Contract 688-II  
Payments Clause Thresholds 95/95 Exempt





# APPENDIX D

QUARTER	COMPOSITE	ESCALATION	NET INVESTMENT	PROFIT
1	017527	527250	0	0
2	040707	210900	0	0
3	0827557	10081600	0	0
4	129730	22527500	0	0
5	172063	26192700	0	0
6	212002	45731000	0	0
7	255527	65610100	0	0
8	275260	64821400	0	0
9	302151	73959700	0	0
10	322151	62574000	0	0
11	342266	64232000	0	0
12	392472	105122000	0	0
13	422551	116410000	0	0
14	45014	130542000	0	0
15	498225	146751000	0	0
16	541226	165027000	0	0
17	587007	182264000	0	0
18	622253	200740000	0	0
19	67740	227520000	0	0
20	754320	266243000	0	0
21	817705	300521000	0	0
22	866567	326872000	0	0
23	902452	346511000	0	0
24	927625	364100000	0	0
25	961201	377020000	0	0
26	983645	382613000	0	0
27	992243	394026000	0	0
28	1024624	403382000	0	0
29	1032700	401027000	0	0
30	10322000	401022000	0	0
31	10322000	401022000	0	0
32	10322000	401022000	0	0
TOTAL PROFIT				1309800
				1500770

Contract 688-II  
 Payments Clause Thresholds 100/100 Exempt



# APPENDIX D

QUARTER	COMPLETIF	ESCALATION	NET INVESTMENT	PROFIT
1	0107527	537300	0	0
2	0097007	1000000	0	0
3	0090057	1000000	0	0
4	1000000	22527500	0	0
5	1720000	24100000	0	0
6	2120000	45700000	0	0
7	2460000	50100000	0	0
8	2750000	64300000	0	0
9	3000000	72000000	0	0
10	3200000	80000000	0	0
11	3400000	88000000	0	0
12	3600000	96000000	0	0
13	3800000	104000000	0	0
14	4000000	112000000	0	0
15	4200000	120000000	0	0
16	4400000	128000000	0	0
17	4600000	136000000	0	0
18	4800000	144000000	0	0
19	5000000	152000000	0	0
20	5200000	160000000	0	0
21	5400000	168000000	0	0
22	5600000	176000000	0	0
23	5800000	184000000	0	0
24	6000000	192000000	0	0
25	6200000	200000000	0	0
26	6400000	208000000	0	0
27	6600000	216000000	0	0
28	6800000	224000000	0	0
29	7000000	232000000	0	0
30	7200000	240000000	0	0
31	7400000	248000000	0	0
32	7600000	256000000	0	0
TOTAL PROFIT	81872000			

Contract 688-II  
 Payments Clause Thresholds 100/105 Exempt



# APPENDIX D

QUARTER	COMPLETIE	ESCALATION	NET INVESTMENT	PROFIT
1	0194274	39160.1	-64498	64498
2	0255624	70203.3	-84867	20369
3	0316974	113414	-105234	20367
4	0541923	305662	-179918	74684
5	0787321	642512	-261376	81458
6	101227	575843	-336064	74688
7	130379	1503670	-44483	98448
8	163599	2132300	-54512	108624
9	203477	3000000	-43136	108384
10	252556	4205260	-675520	132384
11	304704	5690730	-833480	162960
12	359018	7443940	-1011620	173136
13	419223	9666240	-1194930	183312
14	485685	12710600	-1391820	196896
15	556237	16496500	-1612480	220656
16	625767	20929100	-3279630	2667150
17	692229	26255300	-5282090	2002460
18	756647	31953500	-7196210	1914110
19	817996	37745200	-9051420	1855220
20	868099	42942900	-10818300	1766860
21	903386	46932400	-11956500	1138190
22	934561	50648900	-12560300	603856
23	955013	53371300	-13092800	532464
24	972393	55877300	-13459900	367152
25	98364	57601900	-13781700	321712
26	989775	58544900	-26751000	12969300
27	994888	59370000	-26027600	176672
28	1	60236000	-27074900	147232
TOTAL PROFIT			-28800000	1725120

Contract DLGN-38  
 Payments Clause Thresholds 105/105 Not Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0194274	39160.1	0	0
2	0155624	70203.3	0	0
3	0031697	113414	0	0
4	0054192	305662	0	0
5	0078732	642512	0	0
6	0101227	975843	0	0
7	0130839	150367	0	0
8	0163599	212230	0	0
9	0203477	320606	0	0
10	0252556	420528	0	0
11	0304704	569078	0	0
12	0359918	744894	0	0
13	0419223	966624	0	0
14	0485035	1271000	0	0
15	0556237	1649650	279630	3279630
16	0625767	2092910	-3282090	2002460
17	0692229	2622570	-7196210	1914110
18	0756647	3185350	-9051420	1855220
19	0817999	3774520	-10818300	1766860
20	0860999	4294260	-11956500	1138190
21	0933886	4653200	-12560500	603656
22	0934561	5064880	-13492800	532464
23	095591	5337130	-13459900	367152
24	0972393	5587730	-13781700	321712
25	098364	5760190	-26751000	12969300
26	0989775	5854490	-26927600	176672
27	0994888	5937060	-27074900	147232
28	1	6023600	-2880000	1725120
TOTAL				
28800000				

Contract DLGN-38  
 Payments Clause Thresholds 100/105 Not Exempt





# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0194274	105129	0	0
2	0255624	122491	0	0
3	0316574	395284	0	0
4	0541923	1846990	0	0
5	0737321	2642280	0	0
6	101227	5401330	0	0
7	130879	7882770	0	0
8	163599	10911400	0	0
9	203477	1476000	0	0
10	252556	19575400	0	0
11	304704	25025200	0	0
12	359918	311226300	0	0
13	419225	381152300	0	0
14	485085	46110400	0	0
15	556237	54801200	0	0
16	625757	63491400	0	0
17	692229	72132800	0	0
18	756647	80681500	0	0
19	817096	89573500	0	0
20	868099	96901900	0	0
21	903086	102220000	0	0
22	934561	106519000	0	0
23	955013	110225000	0	0
24	972393	113222000	0	0
25	983645	1152218000	0	0
26	989775	1162250000	0	0
27	994888	117139000	0	0
28	1	118059000	0	0
TOTAL				
PROFIT				
28800000				

Contract DLGN-38  
 Payments Clause Thresholds 100/105 Not Exempt  
 688-II Indices



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0194274	39160.1	221489	0
2	0225524	70203.3	223366	0
3	0316574	113414	362852	0
4	0541922	303662	627857	0
5	0787321	642512	921893	0
6	1012227	975943	1192690	0
7	130279	1503670	1554138	0
8	163599	2122300	1955310	0
9	203477	3000060	2449310	0
10	252556	4205260	3064160	0
11	304754	5699780	3727690	0
12	359518	7448540	4439520	0
13	4192233	9666240	5220530	0
14	485685	12710000	6123790	0
15	5592377	16496500	7110320	0
16	625767	20929100	8117650	0
17	6922229	26255700	91134900	0
18	759647	31853500	10144800	0
19	817996	37745200	11133600	0
20	863099	42942900	11956700	0
21	903896	46912000	12560500	0
22	934561	50948800	13093000	0
23	95561	53371300	13460200	0
24	972393	55877800	13781900	0
25	98364	57601900	13751000	26751000
26	989775	59544900	-26927600	176672
27	994888	59370600	-27074900	147232
28	1	60236000	-28800000	1725120
TOTAL PROFIT				
28800000				

Contract DLGN-38  
 Payments Clause Thresholds 95/95 Not Exempt



# APPENDIX D

QUARTER	ADJUSTED	DEVALUATION	NET INVESTMENT	PROFIT
1	0194274	39160.1	221439	0
2	0225644	70262.3	322366	0
3	0316374	115414	363352	0
4	0341922	22662	627357	0
5	0373721	662513	621398	0
6	0411227	975345	1192793	0
7	0438779	1593676	1354129	0
8	0463377	2132560	135310	0
9	0492550	311663	244341	0
10	0522744	4105738	374169	0
11	0552910	509738	3727623	0
12	0583123	762864	4239521	0
13	0613223	936247	5220530	0
14	0643385	1211050	612319	0
15	0673577	1546650	711323	0
16	0703723	1822910	8117650	0
17	0733847	2155770	9134998	0
18	0763930	2474520	10144000	0
19	0794099	2774520	11130000	0
20	0824261	3074520	-2655564	2655564
21	0854411	3374520	-2654723	0
22	0884551	3674520	-1510364	0
23	0914691	3974520	-1452370	12168200
24	0944831	4274520	-1450283	0
25	0974971	4574520	-23751900	1142720
26	1005111	4874520	-23751900	176072
27	1035251	5174520	-23751900	147232
28	1065391	5474520	-23751900	1725120
29	1095531	5774520	-23751900	0
30	1125671	6074520	-23751900	0
TOTAL	PROFIT			
20000000				

Contract DIGN-38  
 Payments Clause Thresholds - 95/95 Exempt



# APPENDIX D

QUARTER	CC4PLSTB	DEVELOPMENT	NET INVESTMENT	PROFIT
1	0194274	339160.1	0	0
2	0355024	779313.3	0	0
3	0551074	113414	0	0
4	0771321	105513	0	0
5	0971327	64258437	0	0
6	1191379	575367	0	0
7	1395677	1112127	0	0
8	1593775	321127	0	0
9	1791355	357730	0	0
10	1996119	575730	0	0
11	2197774	7443240	0	0
12	2392235	966240	0	0
13	2595335	1271603	0	0
14	2792377	1645630	0	0
15	2993333	20929100	0	0
16	3192329	27035700	0	0
17	339547	31333500	0	0
18	35966	37145000	0	0
19	378899	42942300	9481600	9481600
20	393800	46323100	0	0
21	414661	50648400	0	0
22	435511	53371300	9286620	9286620
23	45593	55377300	0	0
24	47304	57601400	1932750	1932750
25	489775	59144400	176672	176672
26	504585	59376000	147232	147232
27	519458	60236300	1725120	1725120
28	534385	61236300		
TOTAL PROFIT				
28				

Contract DLGN-38  
 Payments Clause Thresholds 100/100 Exempt





# APPENDIX D

QUARTER	COMPLETION	ESCALATION	NET INVESTMENT	PROFIT
1	0194274	39160.1	0	0
2	0255024	70243.5	0	0
3	0316074	113414	0	0
4	0541023	309060	0	0
5	0767321	471512	0	0
6	0912227	575843	0	0
7	103879	152367	0	0
8	165589	212297	0	0
9	203477	21160	0	0
10	232556	320503	0	0
11	254704	560780	0	0
12	359918	744824	0	0
13	413223	500024	0	0
14	435035	1271700	0	0
15	530237	169023	-27963	27943
16	629767	201294	-230299	230246
17	672229	262570	-165210	191411
18	756047	319935	-451428	135522
19	817005	371453	-121333	170860
20	86000	424270	-135740	543914
21	903036	467320	-167130	672551
22	934594	500430	-174437	53204
23	9591	537130	-371230	526922
24	97239	557700	-371230	321712
25	98994	576100	-357100	371000
26	98994	594600	-269279	176672
27	98994	594600	-269279	176672
28	99430	594600	-269279	176672
29	99430	602500	-269279	176672
TOTAL PROFIT	1			1725120

Contract DIGN-38  
 Payments Clause Thresholds 100/105 Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	3268818	410373	-70421	70421
2	1086023	2054530	-284480	214059
3	181184	4152960	-474640	190160
4	235429	5731770	-616896	142256
5	277423	7163170	-7228128	109856
6	316123	8540830	-8228128	101376
7	349573	9754080	-915456	873224
8	379573	11090500	-994320	788642
9	410753	12606100	-1076030	817128
10	435484	13592800	-1140800	872288
11	463818	15239800	-128130	4122256
12	507527	16305500	-1640380	1368770
13	533711	172156100	-3009760	1794340
14	581722	22534800	-6692860	2050430
15	623281	37413910	-8723290	2124780
16	655591	44534700	-103348100	21251020
17	717209	522591800	-17919200	3120130
18	808003	598220800	-19129100	31209800
19	851632	703224300	-20243700	1114620
20	890323	83457500	-21197600	953855
21	922531	89280800	-21942800	7452216
22	947317	94039500	-22538000	5952200
23	966607	96813200	-22674900	536896
24	977422	99717200	-41122300	18247400
25	988179	101233000	-42444000	1321730
26	993549	102192000	-42258500	141824
27	996774	103195000	-43914000	1328130
28	1			
29				
TOTAL				
PROFIT				43914000

Contract 688-I-(EB)  
 Payments Clause Thresholds 105/105 Not Exempt



# APPENDIX D

QUARTER	COMPLET	ESCALATION	NET INVESTMENT	PROFIT
1	0268818	609655	-70421	70421
2	1086023	4450370	-234480	214059
3	131184	11619100	-476640	190160
4	235484	18649300	-616896	142256
5	277429	23587400	-726752	109356
6	316129	29766500	-828128	101376
7	349403	34900000	-915456	87328
8	379373	39596200	-994328	78664
9	416753	44010300	-1076030	81712
10	455484	48998000	-1140800	64732
11	468818	54758600	-1223130	87322
12	507527	61313500	-1323380	41293
13	53371	67305900	-1640370	13693
14	581721	75226000	-3003760	18837
15	582281	83010700	-4898530	17943
16	622817	92227500	-6592360	17943
17	622817	112257500	-8723290	20304
18	717205	112347000	-10848100	21247
19	765592	123712000	-14799100	39510
20	808603	134471000	-18513900	37148
21	851613	144317000	-23402700	18877
22	892531	152316000	-23643300	32404
23	927312	155558000	-24653600	10231
24	966667	165011000	-25453600	79334
25	97742	168144000	-26086400	62976
26	988172	171381000	-26441500	35597
27	993574	173052000	-41122300	14680
28	996	174086000	-42444000	13217
29	1	175153000	-42585800	14182
TOTAL			-43914000	132313

Contract 688-I-(EB)  
 Payments Clause Thresholds 105/105 Not Exempt  
 688-II Indices



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	2268818	419373	0	0
2	108602	2054530	0	0
3	181183	4152266	0	0
4	235484	5731779	0	0
5	277429	7163179	0	0
6	316129	8540850	0	0
7	349463	9794869	0	0
8	37957	11099500	0	0
9	40357	12606100	0	0
10	4354318	13992280	0	0
11	468318	162339300	0	0
12	507527	19309500	1640380	1640380
13	538771	22150190	-3009760	1369380
14	562581	26564600	-4338530	1388770
15	668817	31426300	-6692860	1794340
16	717205	37413900	-8723290	2030430
17	765592	44534700	-10848100	2124780
18	808603	52552100	-14799100	3951020
19	851613	58220800	-17919200	3120130
20	890323	76324800	-19129100	1209860
21	927312	82457500	-20243700	1114620
22	9473127	89280800	-21197600	953856
23	966667	94039500	-21942800	745216
24	977422	96813200	-22538000	595200
25	983172	99717200	-23374900	336996
26	993549	101236000	-41122300	18247400
27	996774	102192000	-42444000	1321730
28	996774	102192000	-42585800	141824
29	996774	103195000	-43914000	1328130
TOTAL				
PROFIT				
4391400				

Contract 688-I-(EB)  
 Payments Clause Thresholds 100/105 Not Exempt





# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	02688318	4103373	516527	0
2	1886623	2194530	2198620	0
3	181184	4152960	3559750	0
4	23548	7123170	4631630	0
5	27742	8540830	5476960	0
6	3161229	9794000	6260110	0
7	349463	11099500	6537820	0
8	379573	12606100	75533160	0
9	419754	13992800	8209310	0
10	43548	16239800	8734970	0
11	468518	19309500	9462360	0
12	507527	12156100	10330100	0
13	538721	26184300	11047800	0
14	581728	31433600	12062800	0
15	622581	37413900	13059300	0
16	663817	44534700	14211400	0
17	717205	52352100	15460200	0
18	765592	59991800	16743700	0
19	803603	66320300	17919700	0
20	851613	76324800	19129600	0
21	893323	83497500	20244200	0
22	922581	89280900	21198100	0
23	947312	94035500	21943500	0
24	966667	96813200	22538500	0
25	97742	99717200	22975600	0
26	983172	102123000	23122300	41122300
27	993549	102192000	23144000	1321730
28	996774	102192000	23144000	141824
29	1	103195000	23914000	1328130
TOTAL PROFIT				
43914000				

Contract 688-I-(EB)

Payments Clause Thresholds 95/95 Not Exempt



# APPENDIX D

QUARTER	COMPLETION	SCALATION	EST. INVESTMENT PROFIT
1	420,000	41,373	51,327
2	406,000	40,630	21,620
3	411,000	41,290	35,750
4	433,000	47,177	42,163
5	474,000	71,717	54,690
6	512,000	93,330	63,010
7	549,000	97,430	65,750
8	573,000	117,300	75,310
9	613,000	120,000	83,310
10	633,000	123,330	87,370
11	653,000	126,330	94,330
12	673,000	129,330	103,010
13	693,000	131,330	111,780
14	713,000	134,330	120,550
15	733,000	137,330	129,320
16	753,000	140,330	138,090
17	773,000	143,330	146,860
18	793,000	146,330	155,630
19	813,000	149,330	164,400
20	833,000	152,330	173,170
21	853,000	155,330	181,940
22	873,000	158,330	190,710
23	893,000	161,330	199,480
24	913,000	164,330	208,250
25	933,000	167,330	217,020
26	953,000	170,330	225,790
27	973,000	173,330	234,560
28	993,000	176,330	243,330
29	1,013,000	179,330	252,100
TOTAL PROFIT		1,155,000	1,323,130

Contract 688-I-(EB)

Payments Clause Thresholds 95/95 Exempt



## APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0263818	410373	0	5255980
2	1086022	2094530	0	5255980
3	181183	4152000	0	0
4	255484	5751770	0	6373380
5	27742	7163170	0	6473360
6	316129	854000	0	0
7	349463	9794000	0	5905040
8	37957	11090500	0	5385120
9	410753	12609100	0	1321750
10	45484	13992300	0	141825
11	48313	15235300	0	1323130
12	507527	16309500	0	0
13	53371	17156100	0	0
14	581721	22538400	0	0
15	622581	31413600	0	0
16	663317	37415900	0	0
17	717202	445334700	0	5255980
18	765503	52352000	0	5255980
19	803503	59991800	0	0
20	851513	68320800	0	0
21	870523	76324500	0	6373380
22	9222812	83497500	0	6473360
23	94731	89280300	0	0
24	966667	94039500	0	5905040
25	97747	96813200	0	5385120
26	9881729	99817200	0	1321750
27	995547	101236000	0	141825
28	999077	102192000	0	1323130
29	1	102195000	0	0
TOTAL				43914000

Contract	688-I-(EB)		
Payments Clause	Thresholds	100/100	Exempt



## APPENDIX D

QUARTER	COMPLETION	SCALATION	NET INVESTMENT	PROFIT
1	92093125+	211573	0	1640380
2	1191135+	2104330	0	13693380
3	1237455	2132500	0	1883770
4	116135	2171770	0	1794340
5	143455	211170	0	1704430
6	111735	21130	0	124790
7	11735	2150500	0	3951100
8	11735	2152300	0	3714890
9	11735	2152300	0	1683770
10	11735	2152300	0	4643370
11	11735	2152300	0	4400250
12	11735	2152300	0	4129500
13	11735	2152300	0	8499290
14	11735	2152300	0	3318290
15	11735	2152300	0	3318170
16	11735	2152300	0	1413240
17	11735	2152300	0	1323130
18	11735	2152300	0	1323130
19	11735	2152300	0	1323130
20	11735	2152300	0	1323130
21	11735	2152300	0	1323130
22	11735	2152300	0	1323130
23	11735	2152300	0	1323130
24	11735	2152300	0	1323130
25	11735	2152300	0	1323130
26	11735	2152300	0	1323130
27	11735	2152300	0	1323130
28	11735	2152300	0	1323130
29	11735	2152300	0	1323130
30	11735	2152300	0	1323130

Contract ... 688-I-(EB)

Payments	Clause	Thresholds	100/105	Exempt
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# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0408603	380537	91990	0
2	135484	1570210	305024	0
3	208602	2832120	469632	0
4	264516	3821420	575520	0
5	317204	4913260	714144	0
6	359149	5823790	808544	0
7	393549	6646810	886016	0
8	425907	7544220	958640	0
9	455527	8787020	1048210	0
10	507522	10274500	156192	0
11	549462	12100900	12096	0
12	601175	14752100	1149870	1149870
13	652688	17618300	-2311820	1161950
14	706452	20905300	-3522210	1210380
15	760215	24768900	-4732590	1210380
16	817204	29239800	-6015580	1282990
17	874194	34340100	-7239610	1233920
18	912903	38088100	-10027400	2728820
19	94086	41063800	-12514100	2486720
20	962366	43564100	-13010800	496720
21	978495	45598700	-13294100	283248
22	989248	47057200	-19094600	6400490
23	994624	47824300	-21053900	1359260
24	1	48630700	-21174900	1210240
25	1	48630700	-22513100	1338240
TOTAL				PROFIT
				22513100

Contract 688-I-(NN)  
 Payments Clause Thresholds 105/105 Not Exempt



## APPENDIX D

QUARTER	COMPLETE	SCALATION	NET INVESTMENT	PROFIT
1	04036023	5653331	91990	0
2	135840	3278370	335024	0
3	208604	7297740	469632	0
4	2645164	11694600	595529	0
5	317204	16094600	714144	0
6	35914	19733400	828544	0
7	393549	22774200	886016	0
8	425607	25588200	958644	0
9	4655927	29198300	1048210	0
10	5077227	33125400	1956192	0
11	5491075	37271700	12096	0
12	601075	42277000	1140870	149870
13	6526838	47677000	231820	1161950
14	7064525	53524000	3522259	1210380
15	760215	59528700	57325580	1282990
16	817204	66676100	6915580	1283020
17	874194	74046900	7238619	1273800
18	912903	79235400	10027400	1263020
19	9408665	83224000	12514100	12486720
20	9623495	87377100	14136500	1224670
21	973495	88354000	15461200	13233420
22	989248	90668500	19694000	1359260
23	994624	91562400	21053900	1359240
24	994624	92486600	21174900	133338
25	994624	92486600	22513100	133338
26	994624	92486600	22513100	133338
27	994624	92486600	22513100	133338
28	994624	92486600	22513100	133338
29	994624	92486600	22513100	133338
30	994624	92486600	22513100	133338
31	994624	92486600	22513100	133338
32	994624	92486600	22513100	133338
33	994624	92486600	22513100	133338
34	994624	92486600	22513100	133338
35	994624	92486600	22513100	133338
36	994624	92486600	22513100	133338
37	994624	92486600	22513100	133338
38	994624	92486600	22513100	133338
39	994624	92486600	22513100	133338
40	994624	92486600	22513100	133338
41	994624	92486600	22513100	133338
42	994624	92486600	22513100	133338
43	994624	92486600	22513100	133338
44	994624	92486600	22513100	133338
45	994624	92486600	22513100	133338
46	994624	92486600	22513100	133338
47	994624	92486600	22513100	133338
48	994624	92486600	22513100	133338
49	994624	92486600	22513100	133338
50	994624	92486600	22513100	133338
51	994624	92486600	22513100	133338
52	994624	92486600	22513100	133338
53	994624	92486600	22513100	133338
54	994624	92486600	22513100	133338
55	994624	92486600	22513100	133338
56	994624	92486600	22513100	133338
57	994624	92486600	22513100	133338
58	994624	92486600	22513100	133338
59	994624	92486600	22513100	133338
60	994624	92486600	22513100	133338
61	994624	92486600	22513100	133338
62	994624	92486600	22513100	133338
63	994624	92486600	22513100	133338
64	994624	92486600	22513100	133338
65	994624	92486600	22513100	133338
66	994624	92486600	22513100	133338
67	994624	92486600	22513100	133338
68	994624	92486600	22513100	133338
69	994624	92486600	22513100	133338
70	994624	92486600	22513100	133338
71	994624	92486600	22513100	133338
72	994624	92486600	22513100	133338
73	994624	92486600	22513100	133338
74	994624	92486600	22513100	133338
75	994624	92486600	22513100	133338
76	994624	92486600	22513100	133338
77	994624	92486600	22513100	133338
78	994624	92486600	22513100	133338
79	994624	92486600	22513100	133338
80	994624	92486600	22513100	133338
81	994624	92486600	22513100	133338
82	994624	92486600	22513100	133338
83	994624	92486600	22513100	133338
84	994624	92486600	22513100	133338
85	994624	92486600	22513100	133338
86	994624	92486600	22513100	133338
87	994624	92486600	22513100	133338
88	994624	92486600	22513100	133338
89	994624	92486600	22513100	133338
90	994624	92486600	22513100	133338
91	994624	92486600	22513100	133338
92	994624	92486600	22513100	133338
93	994624	92486600	22513100	133338
94	994624	92486600	22513100	133338
95	994624	92486600	22513100	133338
96	994624	92486600	22513100	133338
97	994624	92486600	22513100	133338
98	994624	92486600	22513100	133338
99	994624	92486600	22513100	133338
100	994624	92486600	22513100	133338

Contract	688-I-(NN)	
Payments Clause	Thresholds	105/105
	688-II	Indices
		Not Exempt



# APPENDIX D

UNIT	CLERK	SCALATION	NET INV	SIM. NT	PROFIT
1	049303	350337	31.00	0	0
2	135404	157021	20.024	0	0
3	13602	203120	40.032	0	0
4	135104	203120	50.020	0	0
5	135104	203120	71.144	0	0
6	135104	203120	80.034	0	0
7	135104	203120	83.001	0	0
8	135104	203120	90.034	0	0
9	135104	203120	100.030	0	0
10	135104	203120	100.032	0	0
11	135104	203120	120.00	0	0
12	135104	203120	140.037	0	1.09070
13	135104	203120	131.130	0	1.151050
14	135104	203120	152.213	0	1.210330
15	135104	203120	173.300	0	1.210330
16	135104	203120	194.383	0	1.210330
17	135104	203120	215.461	0	1.210330
18	135104	203120	236.540	0	1.210330
19	135104	203120	257.619	0	1.210330
20	135104	203120	278.698	0	1.210330
21	135104	203120	299.777	0	1.210330
22	135104	203120	320.856	0	1.210330
23	135104	203120	341.935	0	1.210330
24	135104	203120	363.014	0	1.210330
25	135104	203120	384.093	0	1.210330
26	135104	203120	405.172	0	1.210330
27	135104	203120	426.251	0	1.210330
28	135104	203120	447.330	0	1.210330
29	135104	203120	468.409	0	1.210330
30	135104	203120	489.488	0	1.210330
31	135104	203120	510.567	0	1.210330
32	135104	203120	531.646	0	1.210330
33	135104	203120	552.725	0	1.210330
34	135104	203120	573.804	0	1.210330
35	135104	203120	594.883	0	1.210330
36	135104	203120	615.962	0	1.210330
37	135104	203120	637.041	0	1.210330
38	135104	203120	658.120	0	1.210330
39	135104	203120	679.199	0	1.210330
40	135104	203120	700.278	0	1.210330
41	135104	203120	721.357	0	1.210330
42	135104	203120	742.436	0	1.210330
43	135104	203120	763.515	0	1.210330
44	135104	203120	784.594	0	1.210330
45	135104	203120	805.673	0	1.210330
46	135104	203120	826.752	0	1.210330
47	135104	203120	847.831	0	1.210330
48	135104	203120	868.910	0	1.210330
49	135104	203120	890.000	0	1.210330
50	135104	203120	911.089	0	1.210330
51	135104	203120	932.178	0	1.210330
52	135104	203120	953.267	0	1.210330
53	135104	203120	974.356	0	1.210330
54	135104	203120	995.445	0	1.210330
55	135104	203120	1016.534	0	1.210330
56	135104	203120	1037.623	0	1.210330
57	135104	203120	1058.712	0	1.210330
58	135104	203120	1079.801	0	1.210330
59	135104	203120	1100.890	0	1.210330
60	135104	203120	1121.979	0	1.210330
61	135104	203120	1143.068	0	1.210330
62	135104	203120	1164.157	0	1.210330
63	135104	203120	1185.246	0	1.210330
64	135104	203120	1206.335	0	1.210330
65	135104	203120	1227.424	0	1.210330
66	135104	203120	1248.513	0	1.210330
67	135104	203120	1269.602	0	1.210330
68	135104	203120	1290.691	0	1.210330
69	135104	203120	1311.780	0	1.210330
70	135104	203120	1332.869	0	1.210330
71	135104	203120	1353.958	0	1.210330
72	135104	203120	1375.047	0	1.210330
73	135104	203120	1396.136	0	1.210330
74	135104	203120	1417.225	0	1.210330
75	135104	203120	1438.314	0	1.210330
76	135104	203120	1459.403	0	1.210330
77	135104	203120	1480.492	0	1.210330
78	135104	203120	1501.581	0	1.210330
79	135104	203120	1522.670	0	1.210330
80	135104	203120	1543.759	0	1.210330
81	135104	203120	1564.848	0	1.210330
82	135104	203120	1585.937	0	1.210330
83	135104	203120	1607.026	0	1.210330
84	135104	203120	1628.115	0	1.210330
85	135104	203120	1649.204	0	1.210330
86	135104	203120	1670.293	0	1.210330
87	135104	203120	1691.382	0	1.210330
88	135104	203120	1712.471	0	1.210330
89	135104	203120	1733.560	0	1.210330
90	135104	203120	1754.649	0	1.210330
91	135104	203120	1775.738	0	1.210330
92	135104	203120	1796.827	0	1.210330
93	135104	203120	1817.916	0	1.210330
94	135104	203120	1839.005	0	1.210330
95	135104	203120	1860.094	0	1.210330
96	135104	203120	1881.183	0	1.210330
97	135104	203120	1902.272	0	1.210330
98	135104	203120	1923.361	0	1.210330
99	135104	203120	1944.450	0	1.210330
100	135104	203120	1965.539	0	1.210330
101	135104	203120	1986.628	0	1.210330
102	135104	203120	2007.717	0	1.210330
103	135104	203120	2028.806	0	1.210330
104	135104	203120	2049.895	0	1.210330
105	135104	203120	2070.984	0	1.210330
106	135104	203120	2092.073	0	1.210330
107	135104	203120	2113.162	0	1.210330
108	135104	203120	2134.251	0	1.210330
109	135104	203120	2155.340	0	1.210330
110	135104	203120	2176.429	0	1.210330
111	135104	203120	2197.518	0	1.210330
112	135104	203120	2218.607	0	1.210330
113	135104	203120	2239.696	0	1.210330
114	135104	203120	2260.785	0	1.210330
115	135104	203120	2281.874	0	1.210330
116	135104	203120	2302.963	0	1.210330
117	135104	203120	2324.052	0	1.210330
118	135104	203120	2345.141	0	1.210330
119	135104	203120	2366.230	0	1.210330
120	135104	203120	2387.319	0	1.210330
121	135104	203120	2408.408	0	1.210330
122	135104	203120	2429.497	0	1.210330
123	135104	203120	2450.586	0	1.210330
124	135104	203120	2471.675	0	1.210330
125	135104	203120	2492.764	0	1.210330
126	135104	203120	2513.853	0	1.210330
127	135104	203120	2534.942	0	1.210330
128	135104	203120	2556.031	0	1.210330
129	135104	203120	2577.120	0	1.210330
130	135104	203120	2598.209	0	1.210330
131	135104	203120	2619.298	0	1.210330
132	135104	203120	2640.387	0	1.210330
133	135104	203120	2661.476	0	1.210330
134	135104	203120	2682.565	0	1.210330
135	135104	203120	2703.654	0	1.210330
136	135104	203120	2724.743	0	1.210330
137	135104	203120	2745.832	0	1.210330
138	135104	203120	2766.921	0	1.210330
139	135104	203120	2788.010	0	1.210330
140	135104	203120	2809.100	0	1.210330
141	135104	203120	2830.189	0	1.210330
142	135104	203120	2851.278	0	1.210330
143	135104	203120	2872.367	0	1.210330
144	135104	203120	2893.456	0	1.210330
145	135104	203120	2914.545	0	1.210330
146	135104	203120	2935.634	0	1.210330
147	135104	203120	2956.723	0	1.210330
148	135104	203120	2977.812	0	1.210330
149	135104	203120	2998.901	0	1.210330
150	135104	203120	3019.990	0	1.210330
151	135104	203120	3041.079	0	1.210330
152	135104	203120	3062.168	0	1.210330
153	135104	203120	3083.257	0	1.210330
154	135104	203120	3104.346	0	1.210330
155	135104	203120	3125.435	0	1.210330
156	135104	203120	3146.524	0	1.210330
157	135104	203120	3167.613	0	1.210330
158	135104	203120	3188.702	0	1.210330
159	135104	203120	3209.791	0	1.210330
160	135104	203120	3230.880	0	1.210330
161	135104	203120	3251.969	0	1.210330
162	135104	203120	3273.058	0	1.210330
163	135104	203120	3294.147	0	1.210330
164	135104	203120	3315.236	0	1.210330
165	135104	203120	3336.325	0	1.210330
166	135104	203120	3357.414	0	1.210330
167	135104	203120	3378.503	0	1.210330
168	135104	203120	3399.592	0	1.210330
169	135104	203120	3420.681	0	1.210330
170	135104	203120	3441.770	0	1.210330
171	135104	203120	3462.859	0	1.210330
172	135104	203120	3483.948	0	1.210330
173	135104	203120	3505.037	0	1.210330
174	135104	203120	3526.126	0	1.210330
175	135104	203120	3547.215	0	1.210330
176	135104	203120	3568.304	0	1.210330
177	135104	203120	3589.393	0	1.210330
178	135104	203120	3610.482	0	1.210330
179	135104	203120	3631.571	0	1.210330
180	135104	203120	3652.660	0	1.210330
181	135104	203120	3673.749	0	1.210330
182	135104	203120	3694.838	0	1.210330
183	135104	203120	3715.927	0	1.210330
184	135104	203120	3737.016	0	1.210330
185	135104	203120	3758.105	0	1.210330
186	135104	203120	3779.194	0	1.210330
187	135104	203120	3800.283		



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	6408603	3805237	478973	0
2	135484	1579210	1603600	0
3	208602	2322120	2489780	0
4	264516	321420	3168620	0
5	317204	4913260	3816300	0
6	35914	5823790	4233890	0
7	393549	6646810	4762370	0
8	393549	7544220	5170330	0
9	4655927	8787020	5580330	0
10	507527	10274500	6226730	0
11	54946225	12109000	6790110	0
12	601075	14752100	7503650	0
13	652088	17618300	8227950	0
14	70645225	20905300	8957480	0
15	760215	24768900	9795850	0
16	8172044	29239800	10660000	0
17	8741943	34337100	11557400	0
18	912903	39188100	12180600	0
19	94086	41063800	12644100	0
20	9623666	43564100	13011100	0
21	978495	45598700	13294400	0
22	992248	47257300	13694600	19694600
23	994624	47824300	-21053900	1359260
24	1	48630700	-21174900	121024
25	1	48630700	-22513100	1338240
TOTAL PROFIT				
22513100				

Contract 688-I-(NN)  
 Payments Clause Thresholds 95/95 Not Exempt





# APPENDIX D

QUARTER	CUMULATIVE	ESCROWED	TEST	PROFIT
1	1400652	1337	47273	0
2	135494	137021	13366	0
3	278092	23212	23372	0
4	264516	23419	23632	0
5	17204	451226	31650	0
6	2214	53379	43337	0
7	35549	64019	47337	0
8	42507	754420	51732	0
9	405527	87772	52372	0
10	507527	1017+00	62313	0
11	549462	1210000	67011	0
12	651715	1475210	75035	0
13	651715	1721830	82735	0
14	750422	2126530	89763	0
15	76113	247600	97353	0
16	817134	323300	10000	0
17	874334	3470100	11374	0
18	912073	373013	44337	0
19	94036	4103600	231254	2641410
20	96366	4204134	-23141	771134
21	973365	455673	-12374	37565
22	98249	475700	-13078	732220
23	99024	4742400	-117+00	135026
24	994024	486170	-117+00	13134
25	1	486200	-225131	1236240
TOTAL PROFIT				
22513165				

Contract 688-1-(NN)

Payments Clause Thresholds 95/95 Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0408693	380537	91990	0
2	135484	1570210	305324	0
3	120802	2832120	469532	0
4	2645154	3821420	595520	0
5	317254	4613200	714144	0
6	3393149	5023790	808544	0
7	323097	6646810	986016	0
8	4355927	7544220	958640	0
9	5075227	8787050	1048210	0
10	549475	10274500	956192	0
11	601075	12100900	12096	0
12	6526832	11752300	0	0
13	706415	17618300	0	0
14	7622104	29505300	0	0
15	8172104	24768900	0	0
16	874194	29233800	0	0
17	912303	34340100	0	0
18	94036	38288100	-4390060	4390060
19	940366	41063300	-8780110	4390060
20	940366	43564100	-9918340	1138220
21	973495	45598700	-15546600	5628270
22	989243	47057300	-19654600	4147980
23	994624	47824300	-21053900	1359260
24	1	48630700	-21174900	121024
25	1	48630700	-22513100	1338240
TOTAL PROFIT				
22513100				

Contract 688-I-(NN)  
 Payments Clause Thresholds 100/100 Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	9408603	380537	91990	0
2	135484	1570210	305024	0
3	208602	2821120	469632	0
4	264516	4011420	595520	0
5	317204	5821320	714144	0
6	359149	8023790	868544	0
7	393549	6646810	886016	0
8	425807	7544220	958640	0
9	465527	8787020	1048210	0
10	507527	10274500	956192	0
11	549432	12100900	12096	0
12	601075	14752100	1149870	149870
13	652688	17618300	23511823	1161950
14	706452	20905500	232210	1210380
15	760215	24768900	4732593	1210380
16	817204	29239800	6015580	1282990
17	874194	34388100	7298610	1283020
18	912933	38188100	10027490	1288800
19	94086	41063800	12514100	2728720
20	962366	43564100	14136500	2486720
21	978493	4558700	16356900	1622380
22	989249	47057300	19094600	220440
23	994624	47824300	21053900	3337640
24	1	48630700	21174900	1359260
25	1	48630700	22513100	121024
26	1	48630700	22513100	1338240
27	1	48630700	22513100	1338240
28	1	48630700	22513100	1338240
29	1	48630700	22513100	1338240
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31	1	48630700	22513100	1338240
32	1	48630700	22513100	1338240
33	1	48630700	22513100	1338240
34	1	48630700	22513100	1338240
35	1	48630700	22513100	1338240
36	1	48630700	22513100	1338240
37	1	48630700	22513100	1338240
38	1	48630700	22513100	1338240
39	1	48630700	22513100	1338240
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41	1	48630700	22513100	1338240
42	1	48630700	22513100	1338240
43	1	48630700	22513100	1338240
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46	1	48630700	22513100	1338240
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87	1	48630700	22513100	1338240
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91	1	48630700	22513100	1338240
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93	1	48630700	22513100	1338240
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104	1	48630700	22513100	1338240
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166	1	48630700	22513100	1338240
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171	1	48630700	22513100	1338240
172	1	48630700	22513100	1338240
173	1	48630700	22513100	1338240
174	1	48630700	22513100	1338240
175	1	48630700	22513100	1338240
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192	1	48630700	22513100	1338240
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199	1	48630700	22513100	1338240
200	1	48630700	22513100	1338240
201	1	48630700	22513100	1338240
202	1	48630700	22513100	1338240
203	1	48630700	22513100	1338240
204	1	48630700	22513100	1338240
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206	1	48630700	22513100	1338240
207	1	48630700	22513100	1338240
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209	1	48630700	22513100	1338240
210	1	48630700	22513100	1338240
211	1	48630700	22513100	1338240
212	1	48630700	22513100	1338240
213	1	48630700	22513100	1338240
214</				



# APPENDIX D

QUANTITY	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0464241	156908	37139	0
2	104141	424643	83313	0
3	158293	752988	126475	0
4	208181	1091180	166226	0
5	254705	1427930	203760	0
6	303639	1812130	242912	0
7	351355	2226810	289683	0
8	419072	2557670	335248	0
9	48348	2823490	390464	0
10	570891	4360630	167136	167136
11	66123	5373110	-189340	722704
12	74555	6515610	-1572400	722704
13	826851	7434860	-2214800	682560
14	900879	8758420	-2877040	642240
15	949812	9587160	-3198490	592240
16	976161	10033900	-3409290	391456
17	993727	10453000	-4497490	210800
18	1111	10590900	-6239980	1688190
19	1111	10590900	-7019980	1742500
20	1111	10590900	-7019980	779399
21	1111	10590900	-7019980	0
22	1111	10590900	-8000000	980017
TOTAL PROFIT				8000000

Contract 637-(2)  
 Payments Clause Thresholds 105/105 Not Exempt





# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	0464241	360408	37139	0
3	104141	1272940	83313	0
4	158283	2515080	126475	0
5	203281	3758440	166526	0
6	254705	4979210	203760	0
7	303639	6238740	242912	0
8	361355	7738810	289088	0
9	419072	9319830	335248	0
10	48308	11241200	390464	0
11	570891	13656000	167136	167136
12	66123	16233600	1890340	722704
13	74655	18576100	1572400	682560
14	826851	21623100	2214800	642400
15	900879	24215700	2807040	592240
16	949812	26029100	3198490	391456
17	976161	27586100	3409290	210800
18	993727	27800800	4869790	1460500
19	111111	28670400	6239980	1370190
20	111111	28070400	7019980	779999
21	111111	28070400	7019980	0
22	111111	28070400	8000000	980017
TOTAL				8000000

Contract 637-(2)  
 Payments Clause Thresholds 105/105 Not Exempt  
 688-II Indices



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	0	156908	37139	0
3	0	134643	83313	0
4	0	752988	126475	0
5	0	1091180	166626	0
6	0	1427930	203769	0
7	0	1812130	242912	0
8	0	2295810	289088	0
9	0	2827670	335248	0
10	0	3503490	390464	0
11	0	4366630	167136	167136
12	0	5373110	-187340	722704
13	0	6515610	-1572400	682560
14	0	7634860	-1214300	642400
15	0	8758420	-3807040	592240
16	0	9587180	-3198490	391456
17	0	10383900	-3409290	210800
18	0	10453000	-4497490	1086190
19	0	10590900	-6234980	1742500
20	0	10590900	-7019980	779999
21	0	10590900	-7019980	0
22	0	10590900	-8000000	980017
TOTAL				PROFIT
				8000000

Contract 637-(2)  
 Payments Clause Thresholds 100/105 Not Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	644241	156908	193543	0
3	104141	434643	438298	0
4	158093	752988	670922	0
5	218281	1091180	887685	0
6	254735	1427930	1092229	0
7	303639	1812130	1335179	0
8	361355	2250810	1569270	0
9	419072	2827670	1817680	0
10	489081	3503450	2127500	0
11	570891	4360630	2516000	0
12	661255	5373110	2913570	0
13	746551	6515610	3311980	0
14	826851	7684860	3691600	0
15	909879	8758420	4043440	0
16	949812	9587130	4278610	0
17	976167	10082900	4468830	0
18	993727	10553000	4497570	0
19	1	10590000	4239980	6239980
20	1	10590900	-7019980	779999
21	1	10590900	-7019980	0
22	1	10590900	-8000000	980017
TOTAL PROFIT				800000

Contract 637-(2)  
 Payments Clause Thresholds 95/95 Not Exempt



# APPENDIX D

QUARTER	COMPLETIF	ESCALATION	PUT INVESTMENT	PROFIT
1	0	0	0	0
2	0464241	150936	193943	0
3	104141	454643	453203	0
4	153393	754933	272322	0
5	202381	1091136	187335	0
6	254769	1427936	177221	0
7	303639	1812136	139713	0
8	351255	2276816	153277	0
9	419572	2826673	131769	0
10	49577	3505436	212750	0
11	57691	4397036	250130	0
12	66129	5373110	2913370	0
13	74955	6513613	341133	0
14	82951	7764600	364166	0
15	90377	8798420	4043449	0
16	94312	9537139	4273513	0
17	976104	10433360	4433522	0
18	933727	11452360	-371226	371335
19	111	12527733	-933133	5366254
20	111	13733333	-7329322	775329
21	111	1501133	-7013333	0
22	111	1630769	-3033003	980917
TOTAL PROFIT				800000

Contract 637-(2)  
 Payments Clause Thresholds 95/95 Exempt





# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	0+64241	156904	37139	0
3	104141	434543	83313	0
4	153093	752988	126475	0
5	208281	1091140	166626	0
6	254705	1427920	203760	0
7	303639	1812130	242912	0
8	351355	2296810	289088	0
9	419072	2827670	335248	0
10	48808	3503490	390464	0
11	570391	4360630	0	0
12	66123	5373110	0	0
13	74655	6515610	0	0
14	826851	7684860	0	0
15	900879	8758420	0	0
16	949812	9587130	0	0
17	976161	10083900	0	0
18	993727	10453000	-3120000	3120000
19	1	10590900	-5239980	3119980
20	1	10590900	-7019980	779999
21	1	10590900	-7019980	0
22	1	10590900	-3000000	980017
TOTAL PROFIT				
8000000				

Contract 637-(2)  
 Payments Clause Thresholds 100/100 Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	0464241	156908	37139	0
3	184141	434643	33313	0
4	158093	722508	126475	0
5	208281	1051180	166625	0
6	254705	1427930	203760	0
7	303639	1812130	242912	0
8	361355	2256810	289088	0
9	419172	2827670	335248	0
10	488081	3503490	390464	0
11	570391	4360630	-167136	167136
12	66123	5373110	-389840	722704
13	74655	6515610	-1572400	682560
14	826851	7684860	-2214800	642460
15	903379	8790420	-2807000	592240
16	949312	9597180	-3198490	391456
17	976161	10383900	-3409290	210800
18	993727	10453000	-4869810	1460510
19	1	10590900	-6239980	1370180
20	1	10590900	-7019980	779999
21	1	10590900	-7019980	0
22	1	10590900	-8000000	980017
TOTAL				3000000

Contract 637-(2)  
 Payments Clause Thresholds 100/105 Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	0423077	120661	-12692	12692
3	0103846	386744	-31146	18454
4	0167949	769974	-50384	19238
5	0228235	1272180	-68464	18080
6	0285398	1869340	-85776	17312
7	0347436	2675310	-154224	18448
8	0415385	3674640	-124608	20384
9	048718	4925070	-146144	21536
10	0565385	6484300	-1176540	1030400
11	0644872	8092770	-2424500	1247950
12	0721513	9655850	-3612060	1187570
13	078718	11167000	-4658720	1046660
14	0847436	12631600	-5604730	946016
15	0896154	13914700	-6369610	764880
16	0942508	15177300	-7274810	935200
17	0976923	16297600	-7570130	295312
18	0994872	16936800	-7725930	155808
19	1	17119600	-14060000	6334030
20	1	17119600	-14060000	0
21	1	17119600	-14060000	769999
22	1	17119600	-14830000	870033
TOTAL	15700000	15700000	-15700000	870033

Contract 637-(4)  
 Payments Clause Thresholds 105/105 Non Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	650302	-12692	12692
2	0423077	24892260	-131116	18454
3	• 103846	5192890	-50334	19236
4	• 167949	7854460	-68464	18080
5	• 228205	11595100	-85776	17512
6	• 285298	13421700	-104228	18448
7	• 347436	16646000	-124608	19334
8	• 415535	20167800	-146144	20336
9	• 487113	24205000	-176540	21536
10	• 565285	28588700	-224560	23490
11	• 644372	32955900	-261216	24795
12	• 723513	37084900	-305872	2570
13	• 787183	40849100	-350473	10466
14	• 847436	44691600	-396961	16
15	• 896154	47345500	-436961	76488
16	• 942308	49555700	-472492	18796
17	• 976923	51346700	-502530	20
18	• 994872	51758600	-524464	10337
19	• 111111	51758600	-540600	19340
20	• 111111	51758600	-561353	28
21	• 111111	51758600	-57999	4613
22	• 111111	51758600	-5870033	530
TOTAL				870033

TOTAL PROFIT  
1570000

Contract 637-(4)  
Payments Clause Thresholds 105/105 Not Exempt  
688-II Indices





# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	0423077	120661	0	0
3	103846	386744	0	0
4	167949	764974	0	0
5	228205	1272180	0	0
6	285393	1869340	0	0
7	347426	2670200	0	0
8	415335	3674640	0	0
9	487118	4925070	0	0
10	565385	6444300	-1176540	1176540
11	644372	8052770	-2424500	1247950
12	720513	9655850	-3612060	1127570
13	787186	11167600	-4658720	1046660
14	847436	12631600	-5604730	946016
15	896154	13914700	-6369610	764880
16	942393	15177200	-7274810	905200
17	976923	16297600	-7573130	295312
18	994872	16920800	-7725930	155808
19	1	17119600	-14060000	6334030
20	1	17119600	-14060000	0
21	1	17119600	-14830000	769999
22	1	17119600	-15700000	870033
TOTAL				
PROFIT				15700000

Contract 688-(4)  
 Payments Clause Thresholds 100/105 Not Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	6423077	128661	298591	0
3	103846	386744	737438	0
4	167949	769574	1199870	0
5	239298	1272180	1641660	0
6	337436	1865340	2370450	0
7	347435	2670300	2536050	0
8	415385	3674640	3056140	0
9	497185	4925370	3615120	0
10	565585	6404200	4229850	0
11	644872	8052770	4861930	0
12	720513	9655850	5465150	0
13	737136	11167600	6091740	0
14	847436	12631600	6691610	0
15	896154	13914700	6892650	0
16	942323	15177300	7274930	0
17	976923	16297600	7570320	0
18	994872	16930000	7726090	0
19	1	17119600	-14060000	14060000
20	1	17119600	-14060000	0
21	1	17119600	-14830000	769999
22	1	17119600	-1570000	870033
TOTAL PROFIT				
				1570000

Contract 637-(4)  
 Payments Clause Thresholds 95/95 Not Exempt



# APPENDIX D

QUARTER	COMPLET	EXEMPT	NET INVESTMENT	PROFIT
1	0	12,651	29,359	0
2	• 0423377	390,144	73,643	0
3	• 163840	1,136,774	119,272	0
4	• 167243	1,712,180	164,160	0
5	• 223235	1,369,340	207,620	0
6	• 285298	2,678,300	253,050	0
7	• 347435	2,116,340	305,140	0
8	• 413325	2,625,677	361,512	0
9	• 407125	3,414,300	422,345	0
10	• 503320	3,852,770	486,192	0
11	• 601312	4,633,920	546,515	0
12	• 701213	1,116,730	601,700	0
13	• 787111	1,283,130	640,511	0
14	• 837420	1,314,470	639,265	0
15	• 856164	1,517,750	717,100	0
16	• 942300	1,652,600	729,170	26,251
17	• 973722	1,653,000	727,153	56,115
18	• 994372	1,721,700	740,000	93,228
19	1	1,711,312	740,000	76,999
20	1	1,711,960	740,000	76,999
21	1	1,711,960	740,000	76,999
22	1	1,711,960	740,000	76,999
TOTAL-PROFIT				37,003
1573030				

Contract 637-(4)  
 Payments Clauses Thresholds 95/95 Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	NET INVESTMENT PROFIT
1	0	0	0	0
2	• 8423077	120661	0	0
3	• 103846	386744	0	0
4	• 167949	769974	0	0
5	• 229205	1272180	0	0
6	• 285898	1869340	0	0
7	• 347436	2670300	0	0
8	• 415385	3674640	0	0
9	• 48718	4925970	0	0
10	• 565285	6404320	0	0
11	• 644872	8032770	0	0
12	• 720513	9655850	0	0
13	• 78718	11167600	0	0
14	• 847436	12631600	0	0
15	• 896154	13914750	0	0
16	• 942308	15177300	-3155000	3155000
17	• 975923	16397300	-6310900	3155000
18	• 994872	16590800	-10135000	3825000
19	• 111111	17119600	-14060000	3924970
20	• 111111	17119600	-14060000	0
21	• 111111	17119600	-14830000	769999
22	• 111111	17119600	-15700000	870033
TOTAL				
15700000				

Contract 637-(4)  
 Payments Clause Thresholds 100/100 Exempt





# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT PROFIT
1	0	120261	0
2	• 0423071	380760	0
3	• 1033446	765574	0
4	• 37849	1272130	0
5	• 223205	1565300	0
6	• 263398	2673240	0
7	• 347439	2676640	0
8	• 413335	492977	0
9	• 48718	630477	1175749
10	• 565385	852770	1247950
11	• 64372	955350	1161570
12	• 724513	11167600	1046660
13	• 73718	12331900	646016
14	• 847436	1514790	164380
15	• 856157	1517700	181020
16	• 842300	1637600	174360
17	• 976923	16369400	3765419
18	• 949472	17115000	290515
19	1	17115000	0
20	1	17115000	760959
21	1	17115000	676033
22	1	17115000	0
TOTAL PROFIT			
15760095			

Contract 637-(4)  
 Payments Clause Thresholds 100/105 Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	00238095	5834.66	-5119	5119
3	00555238	25414.8	-12797.2	7678.19
4	0191476	138367	-40952	28154.8
5	0464286	441377	-99821	58869
6	0940476	1051140	-202200	102379
7	1702338	22038420	-366600	163860
8	260067	3836900	-57328	207328
9	371429	5873836	-798560	225232
10	480953	8157470	-1034050	235488
11	58881	10818800	-2795260	1671310
12	710715	13445400	-4551770	1840420
13	803572	15821500	-5892660	1341890
14	867857	17560200	-6338800	1341890
15	920233	19088700	-6797850	499556
16	957143	20206500	-7080300	499556
17	982143	21086400	-7293490	290176
18	994043	21522700	-7388670	292464
19	1	21774000	-14965000	98176
20	1	21774000	-14965000	7576300
21	1	21774000	-14965000	0
22	1	21774000	-16500000	1535020
TOTAL PROFIT				1535020

Contract DLGN-36  
 Payments Clause Thresholds 105/105 Not Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	00239095	5834.66	0	0
3	00395238	29414.8	0	0
4	0190476	138367	0	0
5	0464286	441377	0	0
6	0940476	1051140	0	0
7	170238	2208420	0	0
8	260607	3326000	0	0
9	371429	5873830	0	0
10	480953	8157470	0	0
11	55381	10318300	-2705360	2705360
12	710715	13445400	-4551770	1846420
13	803572	15221500	-5893660	1341890
14	867357	17000200	-6338800	495136
15	920238	19288700	-6797350	409156
16	957143	20206500	-7080300	290176
17	982143	21080400	-7290490	202464
18	994048	21532700	-7380670	98176
19	1	21774000	-14965000	7576300
20	1	21774000	-14965000	0
21	1	21774000	-14965000	0
22	1	21774000	-16500000	1535020
TOTAL				
PROFIT				16500000

Contract DLGN-36  
 Payments Clause Thresholds 100/105 Not Exempt



# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	00233095	9834.66	15610.9	0
3	00595238	29414.8	392268.6	0
4	0197476	138367	127872	0
5	0464286	441377	316891	0
6	0941476	1031140	649760	0
7	171238	2268420	1191460	0
8	266667	3836900	1885200	0
9	371429	5873830	2652270	0
10	480953	8157470	3461930	0
11	59381	10318800	4345390	0
12	710715	13445400	5185310	0
13	710715	15821500	5893770	0
14	867357	17560200	6389930	0
15	920238	19088700	6767950	0
16	957143	20206500	7088210	0
17	982143	21080400	7290640	0
18	994048	21532700	738950	0
19	1	21774000	-14965000	14965000
20	1	21774000	-14965000	0
21	1	21774000	-14965000	0
22	1	21774000	-16500000	1535020
TOTAL PROFIT				1650000

Contract DIGN-36  
 Payments Clause Thresholds 95/95 Not Exempt





# APPENDIX D

QUARTER	COMPLETE	ESCALATION	NET INVESTMENT PROFIT
1	0	5834.56	15617.0
2	• 0238395	25414.0	39208.6
3	• 0059523	223367	127375
4	• 013777	411377	316391
5	• 0404225	151114	64876
6	• 074476	238420	1151450
7	• 170238	233693	138527
8	• 25667	5373120	352270
9	• 371450	0157770	392330
10	• 43055	13818300	4345293
11	• 59381	12415600	5183313
12	• 713712	11785070	5922770
13	• 933572	1785070	633930
14	• 094738	12415600	677793
15	• 929143	2133600	738310
16	• 557143	2133600	-316317
17	• 34143	2133600	-356983
18	• 99474	2133600	-1499000
19	1	21177400	-1499000
20	1	21177400	-1499000
21	1	21177400	-1499000
22	1	21177400	-153512
TOTAL PROFIT			153512
155000			

Contract DLGN-36  
 Payments Clause Thresholds 95/95 Exempt



# APPENDIX D

QUARTER	COMPLETE	LIQUIDATION	NET INVESTMENT	PROFIT
1	0	0	0	0
2	00233053	9834.66	0	0
3	00552133	25414.73	0	0
4	0150676	130577	0	0
5	01642200	741177	0	0
6	0540776	1051140	0	0
7	170223	2200420	0	0
8	262667	3330900	0	0
9	371433	5673870	0	0
10	430553	8157470	0	0
11	536411	10518200	0	0
12	710715	12455400	0	0
13	833573	15321500	0	0
14	967257	17570200	0	0
15	920233	19065700	0	0
16	937143	20206500	0	0
17	982143	21500400	-6815000	6815000
18	994042	21532700	-6815000	0
19	1	21777400	-14265000	8149970
20	1	21777400	-14265000	0
21	1	21777400	-14265000	0
22	1	21777400	-14265000	0
TOTAL		21777400	-1535020	1535020

TOTAL PROFIT  
1030 0000

Contract DLGN-36  
Payments Clause Thresholds 100/100 Exempt



# APPENDIX D

QUARTER	COMPLETION	INVESTMENT	PROFIT
1	10228895	9824700	0
2	65052433	2941478	0
3	3199476	131377	0
4	8164286	441377	0
5	6940476	1091140	0
6	172227	136420	0
7	266627	306910	0
8	371429	527220	0
9	489353	8177474	0
10	5583115	16312500	2702360
11	717715	1445470	4551770
12	5533727	1782107	5823680
13	867357	1750000	636680
14	524223	1300700	6737350
15	527143	2100000	700000
16	591143	21732700	93170
17	594043	21774700	1005110
18	1111	1465000	0
19	1111	1465000	0
20	1111	1465000	0
21	1111	1465000	0
TOTAL PROFIT			1635020

Contract DLN-36  
 Payments Clause Thresholds 100/105 Exempt



# APPENDIX D

QUARTER	CUMULATIVE	CALCULATED	DAY AT RISK	PROFIT
1	20234955	5834.46	5119	1119
2	20395135	22414.8	-12791.2	7618.19
3	2137676	133367	-40952	26154.3
4	2466233	441377	-33321	130034
5	2794476	1021160	-23223	131379
6	273235	2236425	-360330	163303
7	260007	3026930	-373223	201328
8	271624	5372822	-738509	225252
9	433953	1574772	-134992	235488
10	52701	13316200	-265250	1671310
11	711715	13415000	-531773	1366420
12	373572	13211555	-592667	1341690
13	877357	1736209	-338333	492126
14	523233	1541666	-371735	439320
15	537143	2209229	-760125	239176
16	583143	2133400	-1343173	3372000
17	69744	2192460	-1355490	93170
18	11	21774200	-14305100	4405110
19	11	21774200	-14305100	0
20	11	21774200	-14305100	0
21	11	21774200	-14305100	0
22	11	21774200	-14305100	0
TOTAL PROFIT				1539020

Contract DLGN-36  
 Payments Clause Thresholds 105/105 Exempt





# APPENDIX D

QUARTER	COMPLETION	ESCROWATION	NET INVESTMENT PROFIT
1	0.3258959	93774.6	51.14
2	0.3542237	18527.7	7678.19
3	0.1173478	19731.1	20184.8
4	0.164226	18333.1	5099.9
5	0.232333	43762.5	1.2379
6	0.27667	17733.9	1633.63
7	0.171677	35323.9	207323
8	0.471977	23333.8	225232
9	0.671977	47133.3	225449
10	0.717712	51333.3	1071310
11	0.33677	51333.3	135542
12	0.378236	55343.9	1532140
13	0.27143	55343.9	1532140
14	0.33143	55343.9	166228
15	0.33143	55343.9	606312
16	0.33143	55343.9	2075.20
17	0.33143	55343.9	1054170
18	0.33143	55343.9	359710
19	0.33143	55343.9	0
20	0.33143	55343.9	1053620
21	0.33143	55343.9	0
22	0.33143	55343.9	0
TOTAL PROFIT			
1650700			

Contract DLGN-36  
 Payments Clause Thresholds 105/105 Exempt  
 688-II Indices



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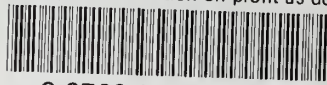
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